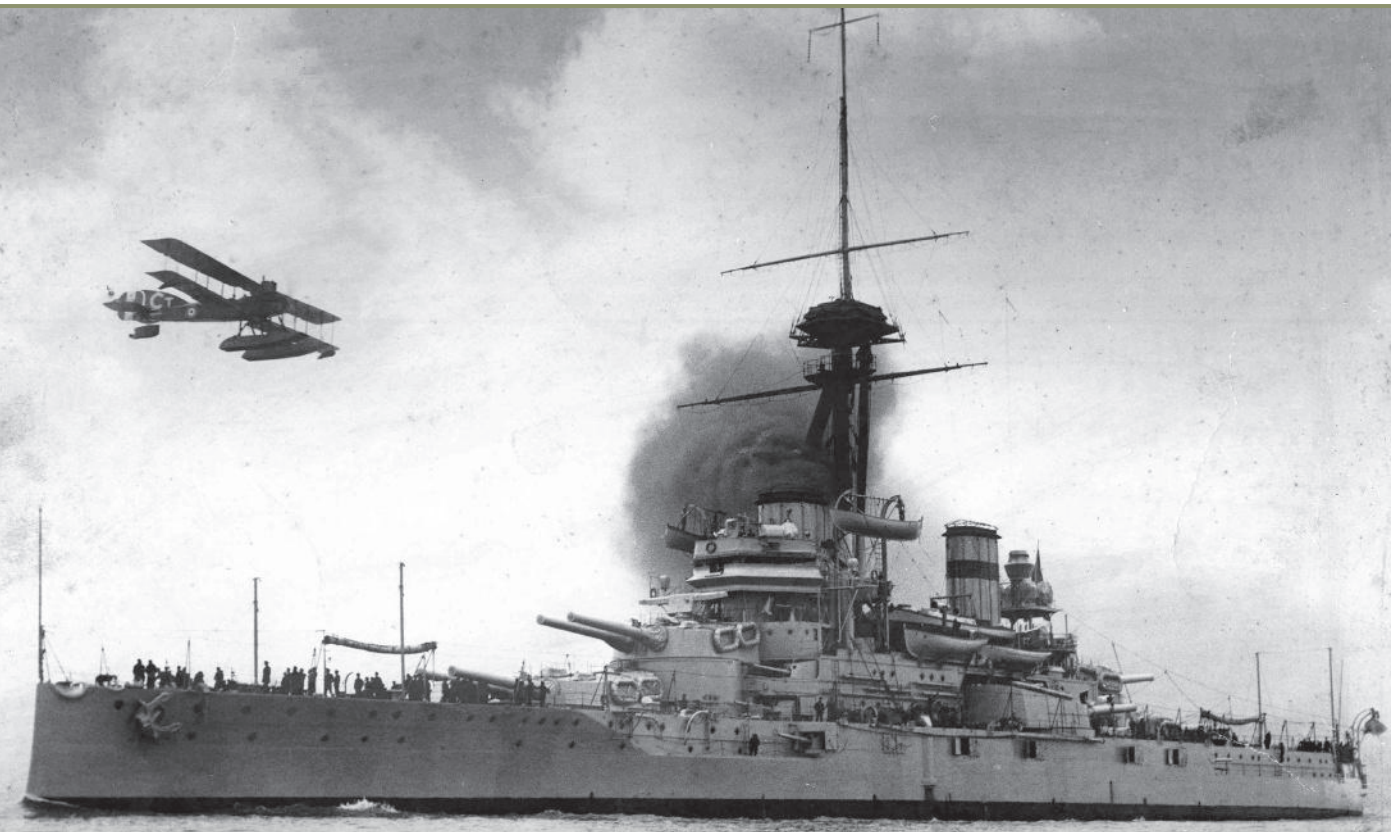
SOUTH AMERICAN BATTLESHIPS 1908–59

Brazil, Argentina, and Chile's great dreadnought race



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NEW VANGUARD 264

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SOUTH AMERICAN BATTLESHIPS 1908–59

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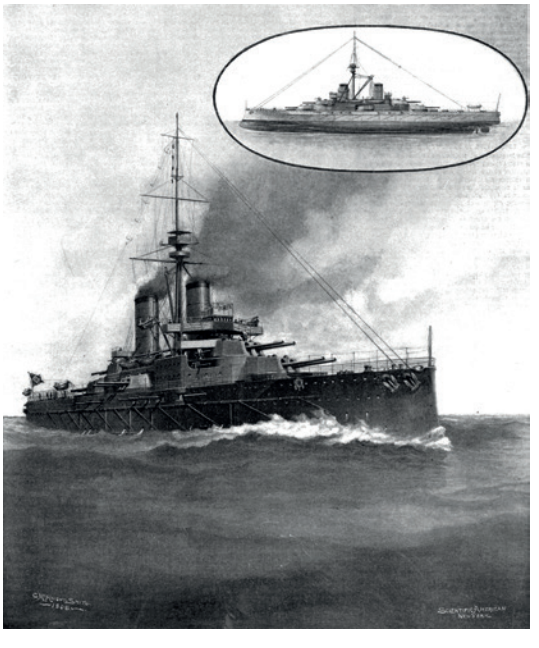
INTRODUCTION

They've got an awful lot of coffee in Brazil. They had an awful lot of rubber in Brazil, too. Between 1870 and 1905 Brazil provided 90 percent of the rubber used in the world market. Starting in the 1890s the new automobile gained popularity. After 1895 it rolled on pneumatic rubber tires. Demand for rubber soared, and so did the price of raw latex, used to produce rubber. Between coffee and rubber, Brazil was getting rich.

The Brazilian government was also getting rich through collected taxes on rubber and coffee. Governments abhor surpluses as nature abhors vacuums. As the 20th century started, Brazil's navy was obsolete. Few ships had been ordered since 1889, when Brazil abolished the monarchy and established itself as a republic. Its neighbors, Chile and Argentina, had much more modern ships. In 1904 the Brazilian legislature chose to use some of its surplus to build a new navy. Money was allocated for three battleships, three armored cruisers, six destroyers, and 12 torpedo boats.

Brazil dreamed of creating the most powerful navy in South America, for reasons of prestige rather than maritime necessity. Initially the press reported Brazil would order three dreadnought battleships – which triggered other South American countries to order their own dreadnoughts. (AC)



This navy would make Brazil the preeminent naval power in South America. Brazil did not have a defense need for the continent's biggest navy. It enjoyed good relations with its maritime neighbors. Between 1870 and 1904 the only foreign war fought by Brazil was the 1899–1903 Acre War against landlocked Bolivia. But Brazil was the largest nation in South America, and prestige demanded Brazil have the largest navy. Besides, it had the money.

Brazil, along with Argentina and Chile, was wealthy by early-20th century standards. By the start of the 20th century Argentina's economy was so strong it was expected to be the United States of the South American continent – an economic powerhouse and world power – by the end of the century. The wealth of all three nations centered on export and trade. Brazil sold coffee and rubber. Prior to World War I Chile had a virtual world monopoly on nitrates (used in the production of explosives and fertilizer), while Argentina was growing rich exporting agricultural goods.

Brazil lacked a shipbuilding industry. It would get its new ships the same way its neighbors obtained theirs: contracting with European or United States shipyards. By doing so, it pressured its neighbors to respond in kind. Brazil's desire for a navy would trigger one of the world's oddest arms races, one which would bankrupt a shipyard and bring Argentina, Brazil, and Chile close to collapse.

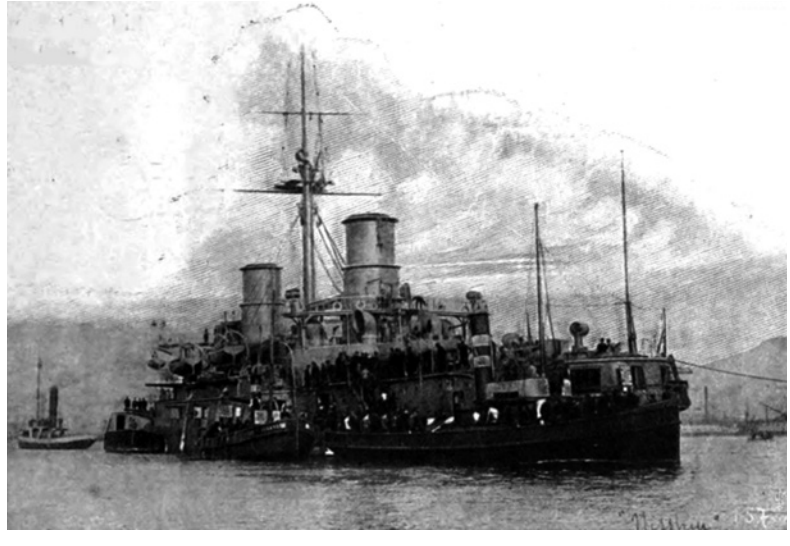
DESIGN AND DEVELOPMENT

Between 1870 and 1914 selling warships to foreign nations was big business. Few nations had shipyards capable of constructing first-line warships. Nations that did improved their balance of trade through exporting warships to nations which did not. The sale of a single battleship brought in millions of pounds, dollars, francs, lire, and marks to the winning shipyard. It provided employment for thousands of skilled workers. It meant a nation could support more shipyards than needed for peacetime naval shipbuilding, creating a construction reserve for wartime. Warships intended for foreign nations could be used to test new technology, allowing shipyards to experiment. Worthwhile innovations were incorporated into future warships built for the home nation. Dead-end technology was sent to countries far, far away.

Buying the latest warship from a foreign yard could be as good for the purchasing nation as the nation building the ship. When Japan went to war with China in 1895 and Russia in 1904 every battleship and armored cruiser in the Imperial Japanese Navy was foreign built. China also purchased warships overseas, while Russia built many of its battleships and armored cruisers domestically. Without acquiring foreign-built warships, Japan would have been unable to challenge Russia at sea. Light and protected cruisers were the biggest ships Japan could build domestically prior to the 1904–05 Russo-Japanese War. No matter how efficient Japanese warships were or how inefficient Russian warships were, protected cruisers were not going to defeat battleships and armored cruisers.

Even Russia purchased warships overseas. Two of Russia's battleships and three of its armored cruisers with its Pacific Squadron at the start of the Russo-Japanese War were built in foreign shipyards. These ships allowed Russia to examine foreign naval technology. The design of Russia's Borodino-class battleships, Russia's most modern warships in 1904, borrowed heavily from *Tsesarvitch*, a battleship built for Russia in France.

The case for powerful South American navies was weaker. Trade requires peace. One of Argentina and Chile's biggest trade partners was



A dispute over the Beagle Channel Islands led Argentina to order two armored cruisers from Italy in 1901. This triggered a naval arms race between Argentina and Chile. Ultimately the two cruisers were sold to Japan in 1903, including this one, which became *Nisshin* in the Imperial Japanese Navy. (AC)

Chile ordered two small battleships from British builders in response to the Argentine armored cruisers. This shows one, *Libertad*, being launched at the Vickers shipyard in Barrow-in-Furness. Britain later purchased both battleships to end this first South American arms race. (AC)

Britain, the world's biggest exporters of warships. Britain liked the profits gained by selling warships to these nations, but Britain preferred the ships to be used for naval reviews rather than actual naval warfare. Most particularly Britain wished to avoid warfare between Argentina and Chile.

The Beagle Channel Islands – Lennox, Nueva, and Picton – were a flashpoint for both nations: three strategically placed islands on the south side of the Beagle Channel, claimed by both Chile and Argentina. The two nations fought over the islands in 1878 before resorting to arbitration. Although an 1881 international treaty granted the islands to Chile, Argentina periodically disputed the decision. A flare-up in 1901 led Argentina to order two armored cruisers from Italian shipbuilders (adding to the four it had) while Chile ordered two small battleships from British yards.

By late 1903 the British government tamped down the conflict through diplomacy. The crisis past, both Chile and Argentina disposed of their newly built warships. Britain purchased the Chilean battleships *Libertad* and *Constitución*, commissioning them into the Royal Navy as HMS *Triumph* and *Swiftsure*. Argentina sold its cruisers to Japan, just before the start of the Russo-Japanese War. The cruisers *Rivadavia* and *Mariano Moreno* were sold to the Imperial Japanese Navy as *Kasuga* and *Nisshin*.

Having cooled this Argentine-Chilean naval arms race three years earlier, the Brazilian order for warships worried His Majesty's Government. Yet it was not seen as something which could trigger a destabilizing new arms race – at least not until Brazil and Sir W. G. Armstrong & Co., Limited (the British shipbuilder with which Brazil had contracted) did something that completely upset the balance of naval power in South America. Armstrongs convinced Brazil to change its order from traditional battleships to dreadnought battleships.

Enter the dreadnought

The armored battleship emerged as a class in the 1880s. In its classic form it emerged as having two main gun platforms, mounted centerline fore and aft, a suite of secondary guns of an intermediate size along the sides, and a tertiary battery of light, quick-firing guns for protection against torpedo boats. By 1900 the main guns had evolved into turrets, typically with two breech-loading guns per turret. These guns ranged in size from a 10in to a 16in bore. The secondary guns ran between 6in and 9.2in. Typically mounted in casemates, by 1900 more were being mounted in wing turrets for a greater field of fire. A typical battleship carried a broadside of five to 12 secondary guns and a similar number of quick-firing guns. While the armor of a battleship varied, a general rule of thumb was that the thickness of the heaviest armor – the centerline belt, main turret and barbettes, and conning tower – was similar to the bore of the main gun.

Through the 1890s the secondary battery decided battles. The main guns had a heavier punch and a much longer range, but their rate of fire was low and range-finding was primitive. To ensure hits ships fought at close range, within the effective range of the secondary guns. These had a much higher rate of fire than the main guns. Naval doctrine held that an enemy battleship would be smothered with secondary fire, preventing it from responding. Then it could be knocked out by the slower-firing main guns.

Sir W. G. Armstrong & Co., Limited (or Armstrongs) was Great Britain's leading exporter of warships. Armstrongs designed six of the eight dreadnoughts ordered by South American nations, and built five. This is the Elswick Shipyard, where these dreadnoughts were built, in April 1904. (LOC)

By the Russo-Japanese War, fire control had improved, and ranges increased. Combat experience revealed that the main guns were often the only guns effective against heavily armored ships. The secondary batteries were useful against unarmored vessels, but proved useless against battleships. Starting in 1900 naval strategists speculated about building a new type of battleship, one without secondary guns. The secondary battery space could be used to mount additional main guns.

Immediately after the Russo-Japanese War, Jackie Fisher, Britain's First Lord of the Admiralty, ordered such a ship. The result was HMS *Dreadnought*. *Dreadnought* mounted ten 12in guns in five twin turrets: three on the centerline and two wing turrets. It had a broadside of eight main guns (twice that of any other single battleship), and fired six ahead or aft (giving *Dreadnought* six times the firepower of conventional battleships in a chase). Its secondary armament consisted of 27 12-pdr (76mm) guns for use against torpedo boats. It was fast, achieving 21kt rather than the more typical 18kt, because it used steam turbines for propulsion rather than triple-expansion engines. It was also as heavily armored as the traditional battleship.

When commissioned in 1906, HMS *Dreadnought* with its all big gun armament made every conventional battleship in commission obsolete. It also provided nations like Brazil with an opportunity to become a leading naval power by having them. (AC)

Ordered in 1905, it was commissioned in 1906. *Dreadnought* made every other battleship obsolete, including the 59 then owned by the Royal Navy. The Royal Navy accepted this because it could build dreadnought battleships – as this new type of battleship was quickly dubbed – faster than Germany, Russia, and France, its main naval rivals.

When *Dreadnought* appeared Brazil had contracts placed with Armstrongs and Vickers, two British shipbuilders, for the three traditional battleships authorized

Eustace Tennyson d'Eyncourt headed Armstrongs' design office in 1906. As talented a sales engineer as he was a naval architect, he convinced both Brazil and Chile to purchase Armstrong-designed dreadnoughts. (LOC)

in 1904. Armstrongs was the world's most successful exporter of warships. Vickers was its chief rival and frequent partner. When a nation wanted two warships the company that got the contract would assign the second ship to the other yard.

Cooperating with a rival had advantages for both builders and the purchasing nation. Building a major warship was a multi-year affair and few yards had the infrastructure to build two simultaneously. If they did, the risk of default by the purchaser was doubled. Countries occasionally canceled contracts. The purchaser benefited by getting its warships faster (as they were built in parallel not series) and was offered protection against its sole shipyard going bankrupt, as occasionally happened.

One reason Armstrongs was so successful in landing contracts was Eustace Tennyson d'Eyncourt, the head of Armstrongs' design office. He was a talented naval architect, especially in regards to warships. (He left Armstrongs in 1912 to become the Royal Navy's Director of Naval Construction and held that post until 1924.) He was also an outstanding sales engineer, a man who understood the needs of his foreign customers, designing ships which fitted their needs.

Construction on Brazil's traditional battleships had started but was halted on the recommendation of Tennyson d'Eyncourt. Recognizing the revolutionary nature of *Dreadnought*, he realized the battleships being built would be obsolete before they were finished. He offered Brazil an alternative. Instead of building standard battleships Brazil should build dreadnoughts. *Dreadnought* was commissioned on December 2, 1906. By the end of that month Brazil's Ministry of Marine canceled its original order of three traditional battleships and asked for dreadnought designs to be considered.

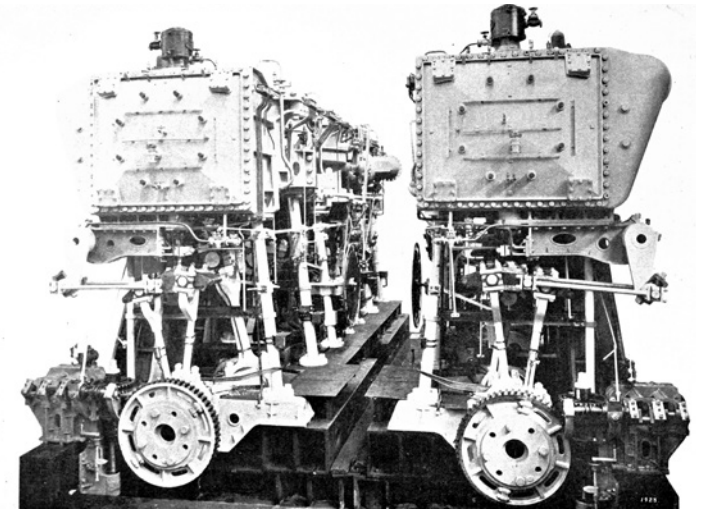
Brazil starts an arms race

The design emerging from Armstrongs' naval architect Josiah R. Perrett was superior in most ways to the trailblazing *Dreadnought*. It carried 12 12in guns in twin turrets to *Dreadnought*'s ten, and a secondary battery of 22 4.7in guns. This was fewer than *Dreadnought*'s 28 12-pdrs, but the Brazilian battleship's 4.7in guns threw a 50lb shell. Moreover, while *Dreadnought*'s 12-pdrs were in open mounts, the 4.7in guns were in armored casemates. The side armor and casemate armor was 1in thicker than the armor on *Dreadnought*. It was 10ft longer, and displaced 1,500 tons more than *Dreadnought*.

It also had a heavier main broadside than *Dreadnought*. As with *Dreadnought*, Perrett's design had two wing turrets. These were set *en echelon*, with the starboard wing turret ahead of the port wing turret. It also had superfiring turrets. The second and next-to-last centerline turrets were mounted higher than the first and last turrets; these turrets could fire over the lower turrets. This gave it a broadside of ten guns, and allowed eight guns to fire ahead and aft. In a theoretical battle with *Dreadnought* this

design could match *Dreadnought*'s broadside while steaming directly at it, giving *Dreadnought* no advantage in crossing this ship's bow.

The design's only weakness was the retention of a triple-expansion steam engine, rather than *Dreadnought*'s steam turbines. This reciprocating design was mechanically less reliable, and less efficient than *Dreadnought*'s turbine engines. Triple-expansion engines were noisy and vibrated heavily at top speed, limiting the ability of the ship to maintain flank speed for long periods of time. Despite the limitations of triple-expansion engines, this ship could steam as fast as *Dreadnought*, 21kt, although it required engines designed to produce 24,000 shaft horsepower (shp) to achieve that speed. *Dreadnought*'s engines could reach 21kt with only 23,000shp.



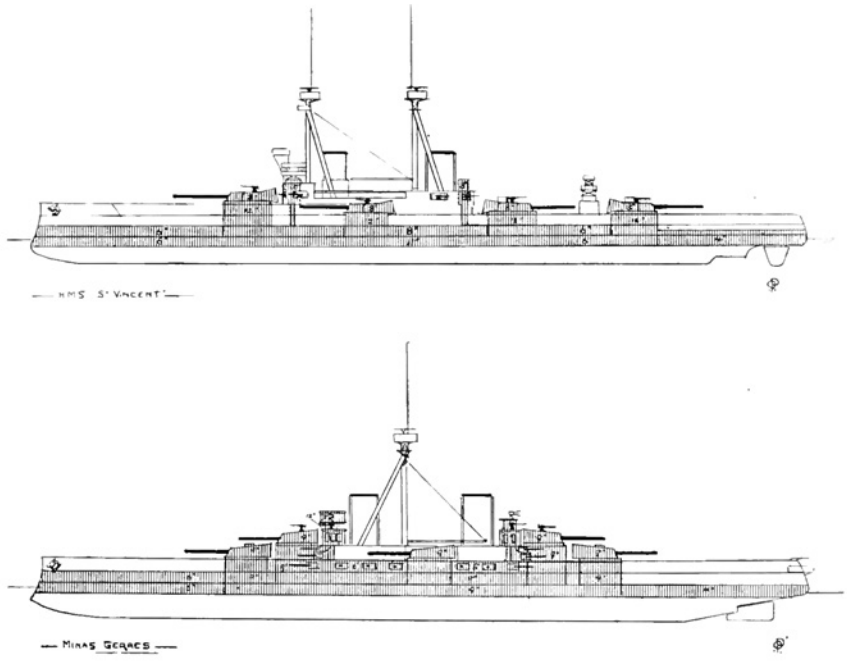
The Minas Geraes-class battleships used triple-expansion steam engines rather than turbines, the only retrogressive element in these ships. These are the engines ultimately installed in *São Paulo*. (AC)

These ships also mounted two submerged 18in torpedo tubes. These were in fixed broadside mountings, one per side, but were virtually useless. They were aimed by turning the ship, and their range was so short it was unlikely for a target to be close enough. The odds of one torpedo actually hitting a maneuvering target were virtually zero. Yet most battleships built up until World War I were equipped with torpedo tubes, so these had them also.

Brazil was delighted. Each dreadnought exceeded the broadside of two traditional battleships. Contracts for two dreadnoughts were signed in the winter of 1907. One, to be named *Minas Geraes*, was to be built by Armstrongs in their Elswick Shipyard on the River Tyne. A second, *São Paulo*, would be built by Vickers at Barrow in Cumbria. Both were named for Brazilian states. Work started on both ships in April 1907. The construction of a third battleship was deferred. Brazil wanted to assess its new warships first.

Brazil wanted both ships finished quickly. Armstrongs and Vickers, two experienced shipbuilding yards, accommodated their customer. *Minas Geraes* was launched on September 10, 1908; *São Paulo* joined it in the water on April 19, 1909. Both were completed and commissioned in 1910.

When *Minas Geraes* entered service in April 1910 only three other nations had dreadnought battleships in commission: Great Britain, Germany, and the United States. *Minas Geraes* and *São Paulo* were then bigger and more powerful than any European dreadnoughts in commission. Their superfiring turrets gave them a qualitative advantage over all other first-generation dreadnoughts. Only the United States had battleships with superfiring turrets, the South Carolina and Delaware class. The South Carolinas had only eight 12in guns, while the Delawares had ten, all in centerline turrets. The first dreadnoughts designed by Britain, Germany, Japan, Italy, and Russia were built without superfiring turrets. Britain would not lay down a battleship with superfiring bow turrets until late 1909 – two months before the first Brazilian dreadnought entered service.



The British St. Vincent-class dreadnoughts (top) were entering service at the same time as *Minas Geraes* (bottom). In every way except propulsion, the Brazilian ships were superior. They were larger, had superfiring turrets allowing a 25 percent heavier firepower broadside, 33 percent heavier firepower forward and aft, and heavier armor. (AC)

No nation could match the Brazilian dreadnoughts' ten-gun main battery except the Delawares, and no battleship would exceed their broadside weight until the British Orion class entered service in 1912. While Brazil may not have had the most powerful navy in the world, when *São Paulo* joined *Minas Geraes*, it was in the top five. It was, by a decisive margin, the most powerful South American navy.

Argentina and Chile join the race

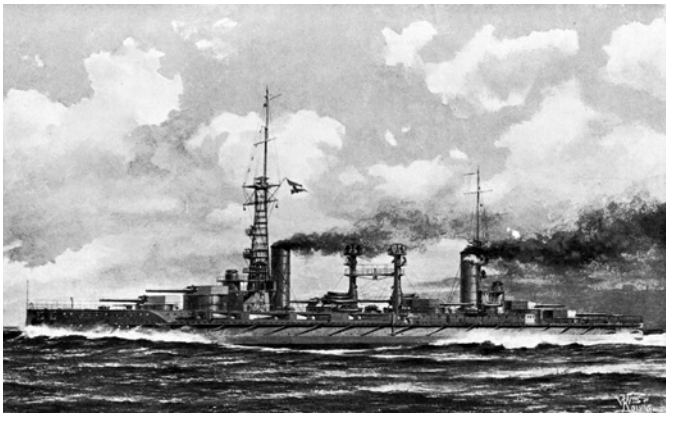
As Armstrongs undoubtedly desired, the Brazilian dreadnoughts triggered a battleship-building race in South America. Argentina, which backed away from its shipbuilding race with Chile earlier in the century, felt threatened. Argentina worried about Brazil's naval expansion when Brazil decided to add three old-style battleships, yet had decided to ignore it. Any single old-style battleship could be met by Argentina's four Garibaldi-class armored cruisers. When Chile ordered two battleships in 1901 Argentina's response was to order two more Garibaldis, not two battleships.

Brazil's dreadnoughts changed the equation. Either one could defeat the combined Argentine and Chilean navy single-handed, with enough ammunition left over to bombard Buenos Aires into submission. While Argentina then enjoyed good relations with Brazil, its Ministry of Marine had to react to capabilities, not intentions. Argentina decided to join the battleship race; in 1908 its legislature authorized the purchase of two dreadnoughts.

While Brazil was locked into Armstrongs, Argentina traditionally bought its warships outside Britain (the Garibaldis were built by Italy). Argentina began shopping for the best deal possible, sending enquiries to French, German, and United States shipyards. Armstrongs sent Tennyson d'Eyncourt to Buenos Aires, but Britain came up empty. Fore River Shipyard in Quincy, Massachusetts got the prize.

Fore River got the contract by undercutting the competition, coming in as the lowest bidder. It had been turning out battleships for the United States Navy since 1901 and was looking to break into building foreign warships. Fore River had experience building dreadnoughts, as one of its projects between 1907 and 1909 was the dreadnought *Delaware*.

In its way, the Fore River design was as innovative in 1909 as *Minas Geraes* had been in 1907. The ship displaced 30,000 tons, and was 50ft longer with thicker armor than the Brazilian dreadnoughts (a 12in belt versus the 9in maximum of the Brazilian ships) and better internal protection. The main gun armament was identical, with 12 12in guns in six twin turrets, but it had 12 6in guns and 16 4in guns as secondary and tertiary batteries. It also had the inevitable two torpedo tubes, mounted in a submerged torpedo room ahead of the forward 12in turret. As with the Brazilian dreadnoughts, two turrets were set *en echelon* on the sides, with four centerline turrets, including two superfiring turrets.

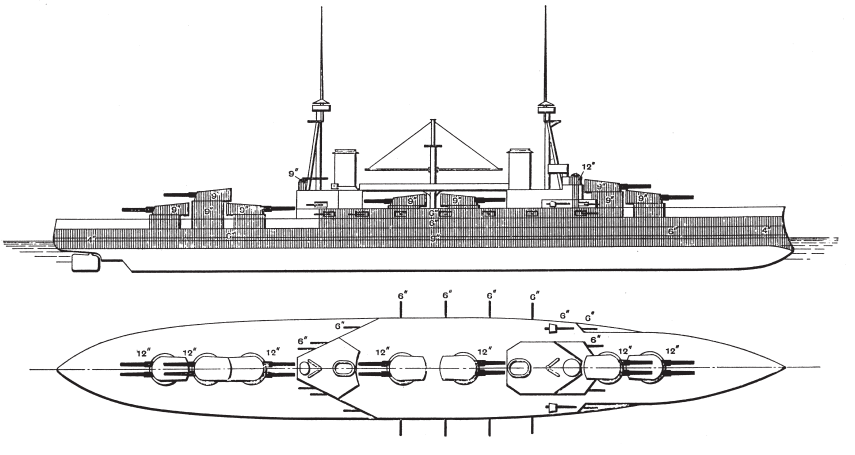


The Argentine response to Brazil's dreadnoughts was to order *Rivadavia* (shown here in a pre-commissioning artist's drawing) and *Moreno*. Although they had the same number of main guns as *Minas Geraes*, they were 50 percent bigger, better protected, and one knot faster. (AC)

Because of the longer length, the wing turrets could theoretically fire cross-ship, permitting a broadside of 12 guns. In reality the field of fire was too limited. The plans showed a capability of firing in a 90-degree arc, but 45 degrees was more accurate. The deck area of this field of fire was filled with ship's boats. A wing turret firing cross-deck would destroy the boats and damage the ship with its muzzle blast.

The propulsion was a generation ahead of *Minas Geraes*'. It had three steam turbines generating 40,000shp. Each engine drove a propeller. The central propeller could be used for cruising, while with all three engines steaming it could drive through the water at 22.5kt.

Fore River began work on one battleship, to be christened *Rivadavia*, in May 1910. At the insistence of Argentina's Ministry of Marine, the second battleship, *Moreno*, was subcontracted to New York Shipbuilding, in Camden, New Jersey.



Rio de Janeiro was Brazil's response to the Argentine dreadnoughts. Although the same displacement and with the same speed as *Rivadavia, Rio de Janeiro* had a broadside of 14 12in guns – the most main guns ever carried on a dreadnought. Note the flying decks to hold boats over the midships turrets. These were removed prior to entering service. (AC)

A

RIVADAVIA

The Rivadavia-class battleships were unique among those built for South American nations. They were the only ones built in the United States, and the only dreadnought battleships built in the United States with wing turrets.

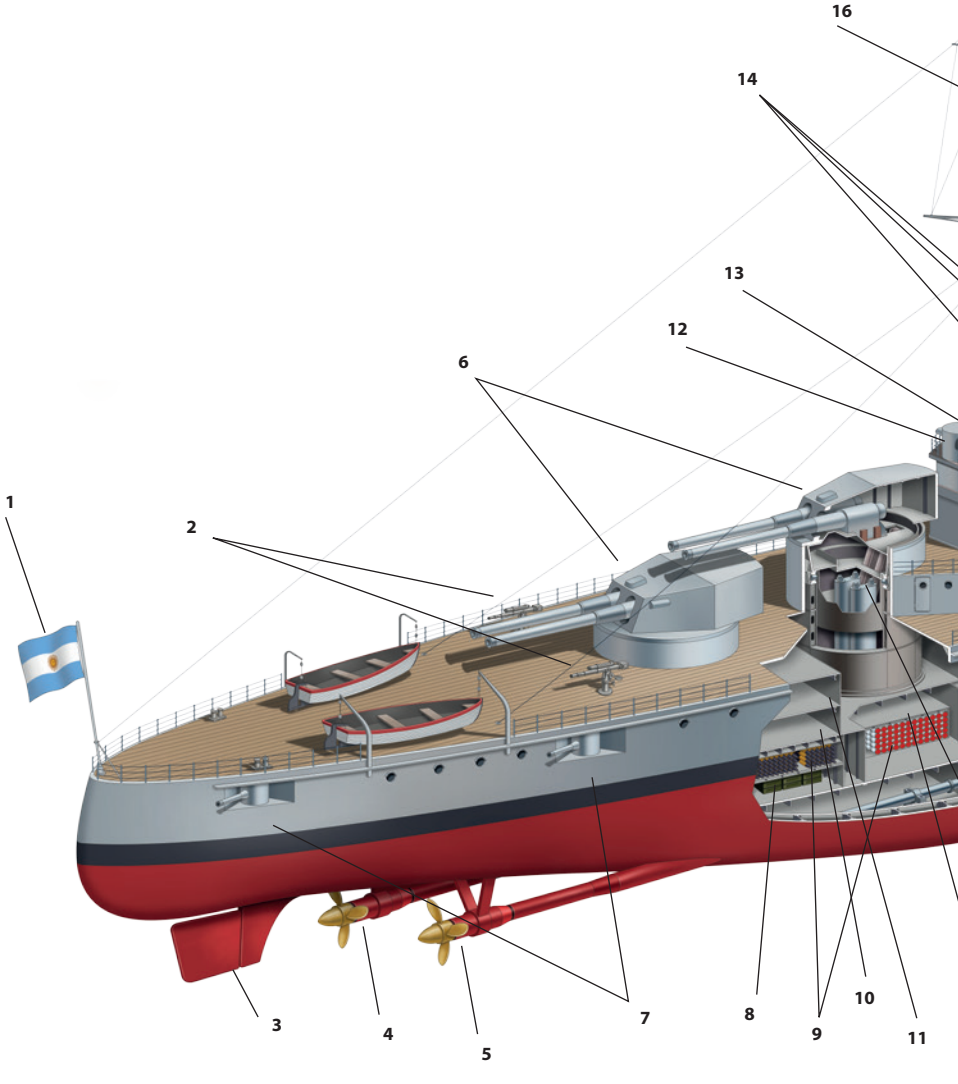
Rivadavia's design was excellent. It had been adapted from plans that the Fore River Shipyard had developed for the United States Navy, and contained much of the then-leading edge technology. On paper its broadside was equal only to Brazil's dreadnoughts, but it was a superior design. It was 50 percent larger, allowing a greater ability to absorb damage. It also had much thicker armor, giving it greater protection. The Rivadavia class had the heaviest armor of any battleships built for a South American nation.

It was propelled by three steam turbine engines. Although more difficult to build, steam turbines were mechanically simpler, operationally more reliable, and created much less vibration than reciprocating steam engines. *Rivadavia* could shut down the outboard engines and cruise using just the center engine, allowing better fuel economy.

The result was a well-balanced design, powerful and reliable.

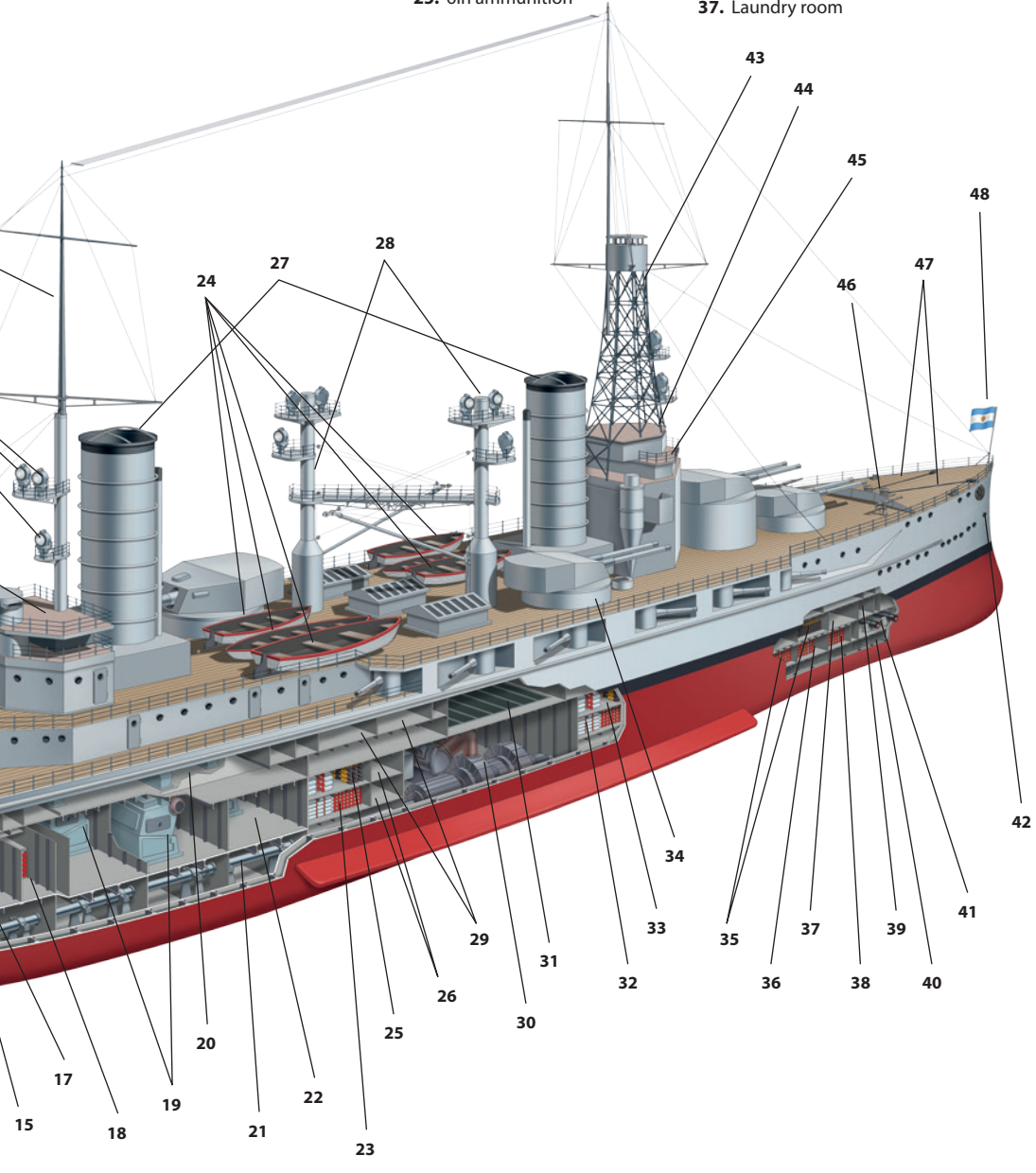
As with all South American dreadnoughts, *Rivadavia* was built more with an eye to crew comfort than combat survivability. It had fewer internal bulkheads than European or North American dreadnoughts, permitting larger, more habitable compartments, at the expense of reserve buoyancy if damaged. The ships also had lavish officers' quarters. The admiral's suite took up most of the superstructure aft of the after funnel. Rank also carried privilege. While the Admiral's reception room came with a grand piano, the officers had to make do with an upright piano in the ward room, while the warrant officers in the gun room had to do without any piano.

The cutaway shows *Rivadavia* as it appeared shortly after arriving in Argentina in 1915.



KEY

1. Flagstaff
2. 4in gun
3. Rudder
4. Center propeller and shaft
5. Starboard propeller and shaft
6. 12in gun turret
7. 6in gun
8. Provisions
9. 12in powder room
10. Crew space
11. Wardroom
12. After conning tower
13. After bridge
14. Searchlights
15. 12in shell handling room
16. Main mast
17. 12in ammunition hoist
18. 12in ammunition room
19. Boiler
20. Boiler uptakes
21. Shaft alley
22. Boiler room
23. 6in powder room
24. Ship's boats
25. 6in ammunition
26. Passageway
27. Smokestacks
28. Boat cranes
29. Crew space
30. Steam turbine (3)
31. Engine hatch/evaporator room
32. 6in powder room/ ammunition
33. 4in ammunition
34. Wing 12in gun turret
35. 4in ammunition
36. Stores and provisions
37. Laundry room
38. Bathroom/lavatory
39. Sail and awning locker
40. Torpedo supplies
41. Torpedo room
42. Anchor
43. Fore mast
44. Conning tower
45. Wheelhouse/chart house
46. Windlass
47. Anchor chain
48. Jackstaff



The Argentine dreadnoughts would give Brazil only naval parity with its neighbor. Determined to maintain the strongest navy in South America, Brazil decided to exercise its option for a third dreadnought. In April 1910, the month before *Rivadavia*'s keel was laid; a delegation from Brazil's Ministry of Marine arrived at Armstrongs to negotiate construction of a new battleship.

The design chosen went through several iterations. As with its first dreadnoughts Brazil wanted the most powerful design possible. Tennyson d'Eyncourt offered a total of nine different possibilities, ranging from a redo of *Minas Geraes* to a 31,000-ton monster with ten 16in guns and a 23kt top speed. Two other designs proposed 16in main batteries, while three others offered 14in main guns. Any of these were superior to the Orion-class ships then under construction for the Royal Navy.

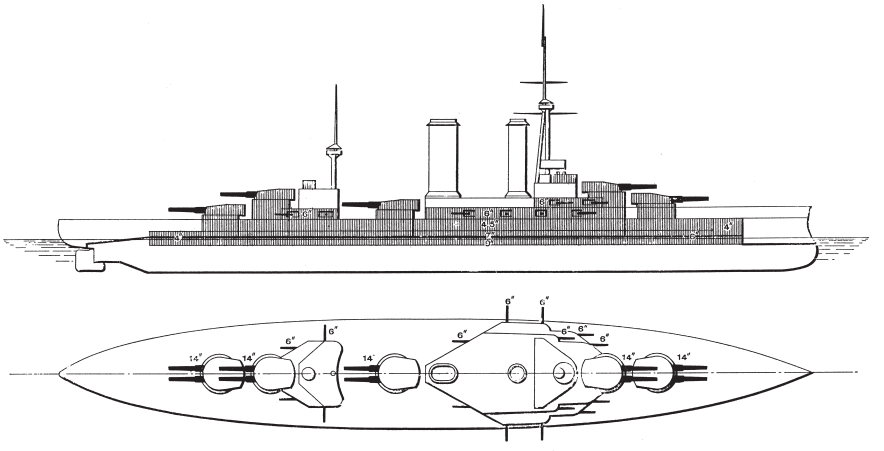
Ultimately, Brazil decided to retain a 12in main battery in its new dreadnought. This simplified navy logistics, requiring only one size of battleship shell for all its dreadnoughts. To maintain the illusion that it had the heaviest battery of any dreadnought under construction, this design had a main battery of 14 guns in seven twin turrets. (British shipyards would not build triple-turret battleships until the Nelson class in the 1920s, although the Russian Ganguts were currently being constructed with four triple 12in turrets.)

To accommodate seven turrets the ship was 688ft long, with a beam of 89ft and a 27ft draft. It displaced almost 31,000 tons. It had four screws propelled by Parsons turbines, which generated 22,000 shp and drove it at a top speed of 22kt. It had a secondary battery of 20 casemate-mounted single 6in guns, ten unprotected 3in guns and four 12-pdr guns. It also had three submerged 21in torpedo tubes, one on each beam and one mounted astern. This ship was also designed by Josiah Perrett.

Despite its record-setting main battery (no other dreadnought mounted 14 main guns) it was a regressive design. It had the same size armor as the first-generation *Minas Geraes*: 9in belt, with 9in armor for the barbettes (12in was used on the earlier ships). Additionally, 14 12in guns had a broadside weight of 11,900lb. The Orion class, with ten 14in guns, had a 14,000lb broadside. Regardless, work started on *Rio de Janeiro* in September 1910, when its keel was laid at the Elswick Shipyard.

Rivadavia under construction in the Fore River Shipyard in Quincy, Massachusetts. The guns have not been installed and much of the armor is missing. Construction was slowed owing to cashflow problems at Fore River, delaying delivery of armor and structural steel. (LOC)

Construction of the Argentine dreadnoughts, done to counterbalance Brazil's battleships, also induced Chile to join the dreadnought race. As with Argentina, Chile shopped around, but more with the intention of getting the best deal possible from Armstrongs than actually using a German, French, or United States yard to build their dreadnoughts. As with Brazil's *Rio de Janeiro*, Tennyson d'Eyncourt provided Chile with a number of design options.



Chile's entry into the South American dreadnought race was the two Almirante Latorre-class battleships. This was a second-generation "super-dreadnought," with larger guns and different arrangement of armor than the first-generation Brazilian and Argentine entries. It was similar in design to the Iron Duke-class battleships then being built for the Royal Navy. (AC)

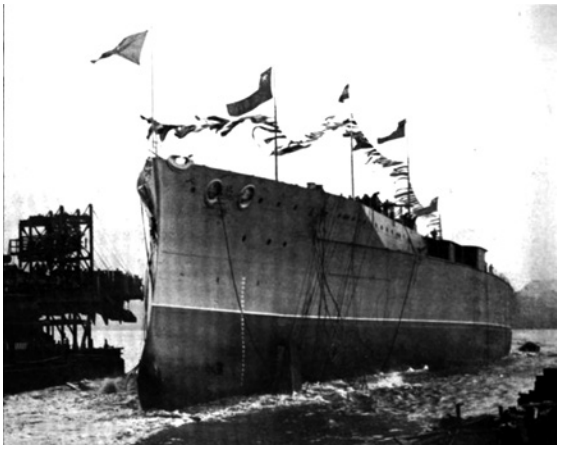
Two were essentially redos of the Royal Navy's *Neptune*, with two *en echelon* wing turrets, and a superfiring stern turret. Both designs, one using a 12in main battery and one with a 14in battery, only offered a broadside of eight guns, as the *en echelon* turrets could not fire cross-deck. Three others were modifications of the Orion class, one of which Armstrongs was currently building. These had the main armament in five centerline twin turrets, but the three designs had different combinations of main gun sizes (12in and 14in) and secondary arrangements.

Ultimately Chile settled on a design with ten 14in guns and 16 6in guns. As with the Minas Geraes-class dreadnoughts and *Rio de Janeiro*, the ship was designed by Josiah Perrett. It was coal-fired, with auxiliary oil fuel for speed boosts. It had four screws driven by two different sets of turbine engines; two Brown-Curtis turbines and two Parsons turbines. The engines delivered 37,000shp. They were intended to drive the ship, initially named *Valparaiso*, at 23kt. The extra weight of the 6in guns substituted for the 4.7in guns of the original design increased the draft by 6in and slowed it to 22.75kt.

The desire for speed also limited the armor. This ship had only a 9in belt and 10in barbette and turret armor. Regardless, the ship was a second-generation "super-dreadnought" with a more powerful battery and higher speed than any other South American dreadnought. The first Chilean dreadnought, renamed *Almirante Latorre* after the Chilean naval officer who captured *Huáscar* during the War of the Pacific, was laid down on May 1, 1912. A sister dreadnought, *Almirante Cochrane*, was ordered, but work did not start on it until February 1913, when the building slip became available when its previous occupant, *Rio de Janeiro*, was launched.

The race unravels

The South American dreadnought race unraveled in 1913. Completion of *Rivadavia* was dragging. Fore River could offer its low price without stinting on quality because it had access to low-price steel. Bethlehem Steel could produce steel and armor plate at lower costs than European mills, including those in Britain, and Fore River bought from them. Rapid expansion, inadequate capitalization, and the periodic nature of payment for naval work completed meant Fore River could not buy steel on a timely basis, delaying



The launch of the *Almirante Latorre* on November 27, 1913. Its completion was slowed during 1913 and early 1914 owing to shortages of armor plate. World War I started before it was delivered, and the Royal Navy took the ship. Chile would not recover it until 1920. (AC)

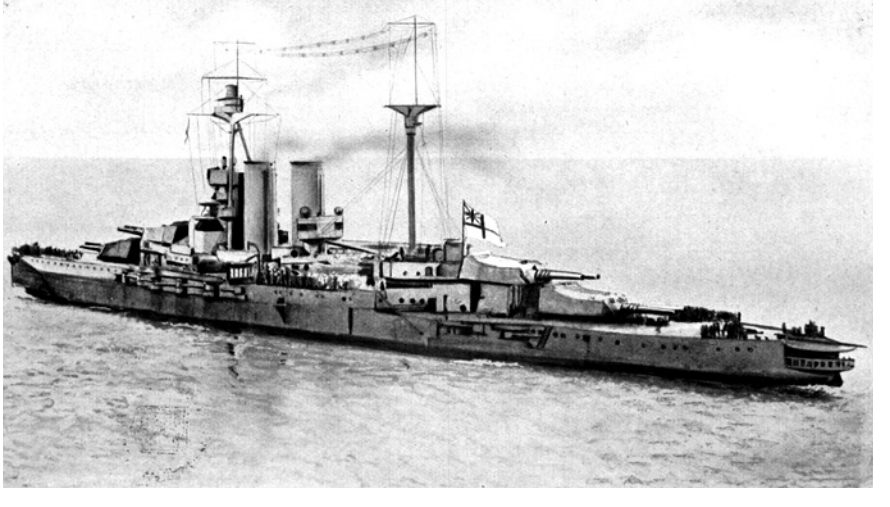
construction of *Rivadavia*. Although the hull was launched in August 1911, it was still incomplete in 1913. That year its chief creditor, Bethlehem Steel, bought the yard, which provided the working capital to obtain armor.

At the same time Brazil was having trouble making payment on its 14-gun monster. Coffee prices tumbled in 1906, reducing revenues from coffee exports thereafter. Then, starting in 1910, but accelerating over the next two years, rubber prices declined. Rubber plantations established in British and Dutch colonies in Southeast Asia, starting in the 1880s, were expanded following the rubber boom of the 1890s. By 1910 the new trees were mature enough to tap for latex. As supply expanded, raw rubber prices tumbled. Plantation rubber was cheaper to produce than the Brazilian product, harvested from wild trees.

Brazil could not raise taxes without risking riots. It found itself with a battleship it could no longer afford. In October Brazil asked Armstrongs to auction off *Rio de Janeiro*. Despite the ship's battery, no nations other than Greece and Turkey expressed interest in it. It was just too odd. Turkey succeeded in finding financing first, and as 1913 ended it purchased the ship.

Brazil considered selling the two battleships it had, but decided to keep both. Argentina and Chile also considered disposing of their dreadnoughts in 1913 and early 1914, but ultimately decided to keep them. The United States would not permit Argentina to sell *Rivadavia* or *Moreno* to potentially hostile nations, which left the only possible buyers in the Americas – and no American nation was interested. Chile considered selling *Almirante Latorre* on the building ways, to Greece, but a lack of Greek financing and Chilean pride kept the deal from getting closed.

Within six months of selling *Rio de Janeiro* Brazil experienced seller's remorse. In February 1914 it decided to buy a third dreadnought after all. Two designs were sent to Brazil for consideration, one with a main battery of eight 15in guns, a second with ten 15in guns. Brazil opted for the more



The final entry in the South American dreadnought race was Brazil's *Riachuelo*. Never started, it was to be armed with eight 15in guns. It would have been similar in appearance to Great Britain's Queen Elizabeth class; *Queen Elizabeth*, the lead ship, is shown here. (AC)

conservative design, and on May 14, 1914 signed a contract to build *Riachuelo* using the eight-gun design.

The design looked similar to Britain's Queen Elizabeth class. *Riachuelo* was 20ft longer and at 30,500 tons displaced 3,000 more tons than HMS *Malaya*, the Queen Elizabeth-class ship Armstrongs was then building. *Riachuelo* had thicker armor, 13½in on the belt and 13in for the barbettes against *Malaya*'s 13in belt and 10in barbettes. *Riachuelo* also was coal-fired, with auxiliary oil fuel, while the Queen Elizabeths were oil-fueled. As a result *Riachuelo* was slower, managing just 22.5kt to *Malaya*'s 25kt top speed.

It would have been a formidable warship, but it was never built. Construction was due to begin on September 11, 1914. One month earlier Britain declared war on Germany, becoming a belligerent in what was then known as the Great War. *Riachuelo* was canceled, its building ways devoted to Royal Navy construction. World War I stopped the South American dreadnought race. It was never resumed.

OPERATIONAL HISTORY

Although the start of World War I ended development of new dreadnoughts for South America, these ships would be used over the next five decades. Their operational history was just beginning. During those years they would steam tens of thousands of nautical miles in the Atlantic and Pacific Oceans, fire their guns in practice and in anger, serve as homes for their crews, and go through numerous refits.

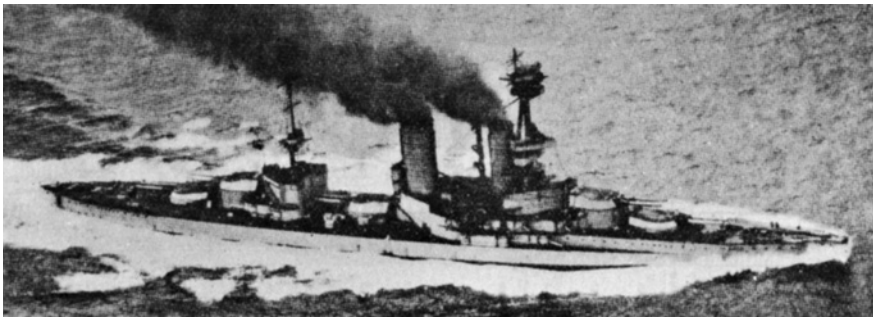
Operations predated World War I. While five of the seven battleships ordered by South American republics did not enter service until after the start of the Great War, *Minas Geraes* and *São Paulo* were commissioned as Brazilian warships in 1910.

Minas Geraes was handed over to Brazil at Armstrongs' Tyneside shipyard on January 5, 1910. From the bitter cold of Newcastle on the North Sea, *Minas Geraes* steamed to Rio de Janeiro, experiencing the southern hemisphere summer. It arrived at Rio de Janeiro on April 17.

São Paulo's maiden voyage was more eventful. Brazil took possession of it on July 12, 1910, but *São Paulo* remained in Britain for two more months. It finally departed Britain on September 16, stopping at Cherbourg to pick up Hermes Rodrigues da Fonseca, newly elected president of the Brazilian Republic. It left Cherbourg two weeks later, making a stop at Tagus in Portugal on October 3. During the visit, the Portuguese fleet on the Tagus mutinied in support of a republican revolution.

São Paulo arrived at Rio de Janeiro on October 25, 1910. With *Minas Geraes* it formed the First Battle Division, the most powerful naval formation in South America. Brazil learned the double-edged nature of seapower a month later. On November 22 crews of the two dreadnoughts mutinied. Officers and senior warrants were put ashore (four officers who resisted were killed).

The differences between officer and sailor, which led to the *Revolta da Chibata* mutiny, can be seen in this photograph. European-ancestry officers take their leisure wearing sharp tailored uniforms, while the largely African-origin sailors toil in poor quality, dirty dungarees. (LOC)



An aerial photograph of HMS *Canada*, the once and future *Almirante Latorre*, taken during its World War I service in the Royal Navy's Grand Fleet. (AC)

The uprising, known as *Revolta da Chibata* (The Revolt of the Lash), was motivated by 18th-century discipline aboard 20th-century warships. Officers came from the European-descended elite, while the sailors were mostly uneducated black men, conscripted for 15-year terms. Although flogging was abolished in the rest of Brazil, corporal punishment was still used in the *Marinha do Brasil* (Brazilian Navy). The mutineers demanded abolition of flogging in the navy and an amnesty.

The Brazilian parliament dithered. A day later the mutinous ships shelled Rio. Manned only by common sailors the ships steamed in formation. Negotiation eventually ended the mutiny with the sailors' main demands granted. When Brazil's marines mutinied on December 10, the ships remained loyal, briefly shelling the marine barracks.

This demonstration of dreadnought capability shook Brazil's neighbors. Their ports could be shelled by Brazil's battleships. It also shook Brazil's government, which realized the ships were too powerful to control. The ships were disarmed in the aftermath of the mutinies, to prevent future bombardments.

World War I

When World War I began, two South American dreadnoughts, *Minas Geraes* and *São Paulo*, were commissioned. Two others were within days of being commissioned. Argentina's *Rivadavia* was in the Charleston Naval Yard in the still-neutral United States, awaiting delivery to the *Armada de la República Argentina* (ARA). *Rio de Janeiro*, sold to Turkey and renamed *Sultân Osmân-ı Evvel*, was on the River Tyne in Britain. Having completed sea trials, 500 Turkish sailors were ready to board the ship.

The second Argentine battleship, *Moreno*, was conducting sea trials off New York City. The two Chilean dreadnoughts were under construction. *Almirante Latorre* had been launched and was being fitted out;

The crew of *Rivadavia*, officers and men, pose before the ship they are about to take possession of in this panoramic photo taken on August 24, 1914. (LOC)

HMS *Agincourt* (originally *Rio de Janeiro*) steaming with the Grand Fleet in 1918 with all 14 of its 12in guns trained out to port. It is following astern of HMS *Erin* (left). *Agincourt* was nicknamed "The Gin Palace," a play on its name (A-Gin-Court) and its luxurious fittings for Brazilian and Turkish service. (USNHHC)

Almirante Cochrane was on the building ways, hull and machinery complete, with boilers installed. *Riachuelo*'s keel was to be laid on September 10.

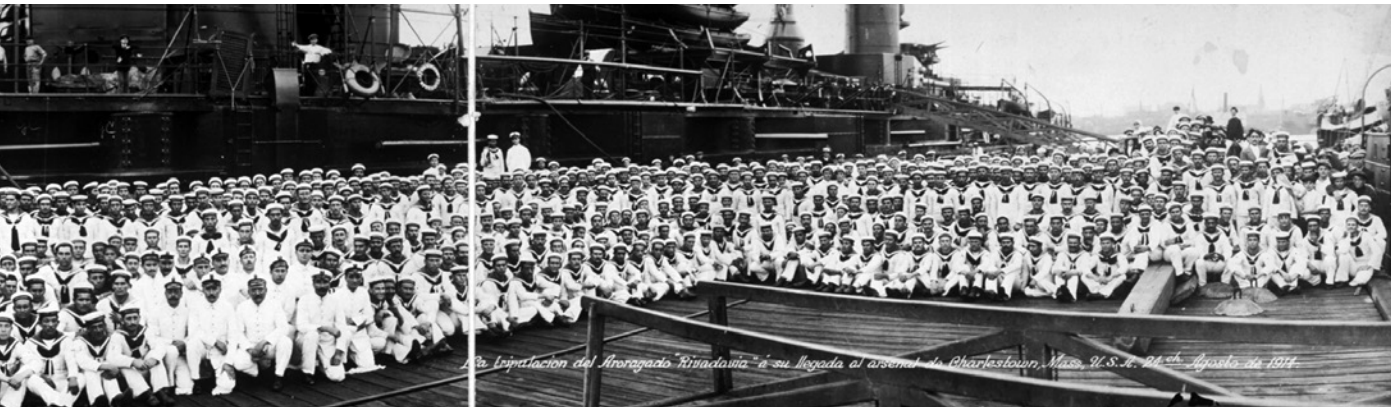
The ships in British yards were affected first. Work was ordered to cease on the Chilean ships and the *Riachuelo*.

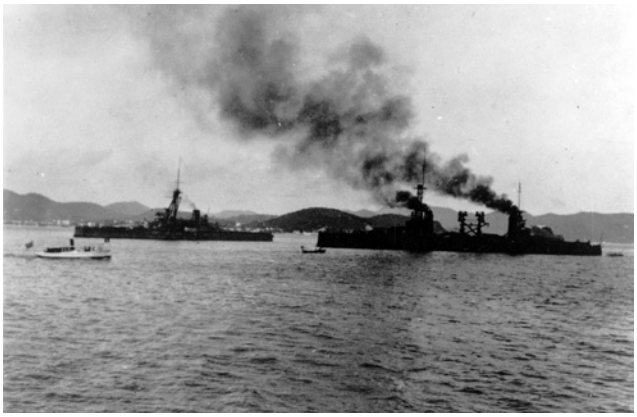
Sultân Osmân-ı Evvel, along with a second Turkish dreadnought, *Reşadiye*, were complete. Delivery of *Sultân Osmân* was overdue. The ship should have been delivered in July, but was bound to a nation with which Britain might potentially be at war soon.

Britain needed warships. Britain's First Lord of the Admiralty, Winston Churchill, ordered both Turkish dreadnoughts detained. On August 2 Britain confiscated *Sultân Osmân*, sending an armed company of the Sherwood Forest Regiment aboard to prevent the Turks from taking it. (Seizing the two battleships helped motivate Turkey to join the Central Alliance in November 1914.) *Sultân Osmân*, née *Rio de Janeiro*, was impressed into the Royal Navy as HMS *Agincourt* on August 7, 1914.

Finding a British crew for the ship was challenging. All available reservists were committed to other warships when *Agincourt* was unexpectedly added to the fleet. The officers and crew of the royal yacht *Victoria and Albert* were transferred en masse to *Agincourt*. The rest of the crew came from any available sailors. Mostly these were defaulters released from detention barracks or other troublemakers.

Raising *Agincourt* to Royal Navy standards was more difficult. To satisfy Brazil's desire for comfort for the crew, the ship had overlarge watertight compartments, allowing larger living spaces. Its armor was also viewed as inadequate. Nothing could be done about either problem. The flying bridges between the two midships turrets were removed, reducing top-hamper and flammability. This provided greater field of fire for the turrets. Fancy fittings were removed, Turkish "squatters" toilets replaced, and English-label dials and nameplates switched for the Turkish ones aboard. On September 7 *Agincourt* joined the Grand Fleet as part of the 4th Battle Squadron. Another member





Off Rio de Janeiro in 1918, a Brazilian Minas Geraes-class battleship can be seen on the left and an Argentine Rivadavia-class battleship on the right. The photograph was taken from USS *Pittsburgh* in October or November 1918. (USNHHC)

of that squadron was HMS *Erin*, formerly the *Reşadiye*.

In the United States, work proceeded less dramatically. *Rivadavia* became a fighting ship of the ARA on August 27, 1914. Completing a considerably more leisurely fitting-out than *Agincourt*, it departed New York on December 23. Its shakedown cruise included a stop at Barbados. *Rivadavia* reached Buenos Aires on February 19, 1915. On May 26, 1915 it was joined by *Moreno*, accepted by Argentina on February 20 and commissioned on February 27. *Moreno* also made a leisurely first voyage, stopping at Hampton Roads for a naval review and visiting the Panama Canal.

Of the three remaining South American dreadnoughts, *Almirante Latorre* was closest to completion. Unlike the Ottoman Empire, Chile was considered a friendly neutral. It also controlled a large percentage of the world's available nitrates, a commodity now desperately needed for munitions. Whereas Great Britain confiscated the Ottoman warships, it purchased the two Chilean dreadnoughts, promising to return them to Chile when the war ended.

Purchase complete, work resumed on *Latorre* in September. The ship was changed. The original bridge and charthouse were modified, a stump mast substituted for twin boat derricks aft of the forward funnel, a pole mast added on the aft superstructure, and the fire control platforms on the masts rearranged to Royal Navy standards.

The work to complete the ship (renamed HMS *Canada*) took a year. *Canada* completed trials on September 13, 1915. Commissioned as a Royal Navy warship the following month, it too joined the Grand Fleet as a member of the 4th Battle Squadron.

B

HMS *CANADA* AT JUTLAND

Of the five dreadnoughts commissioned in South American navies only one, Chile's *Almirante Latorre*, fought in a major naval battle. At the time, however, it was part of the Royal Navy, seized along with *Rio de Janeiro* and *Reşadiye* when World War I started. It fought as HMS *Canada*. On May 31, 1916, *Canada* participated in its first and only fleet action: the battle of Jutland.

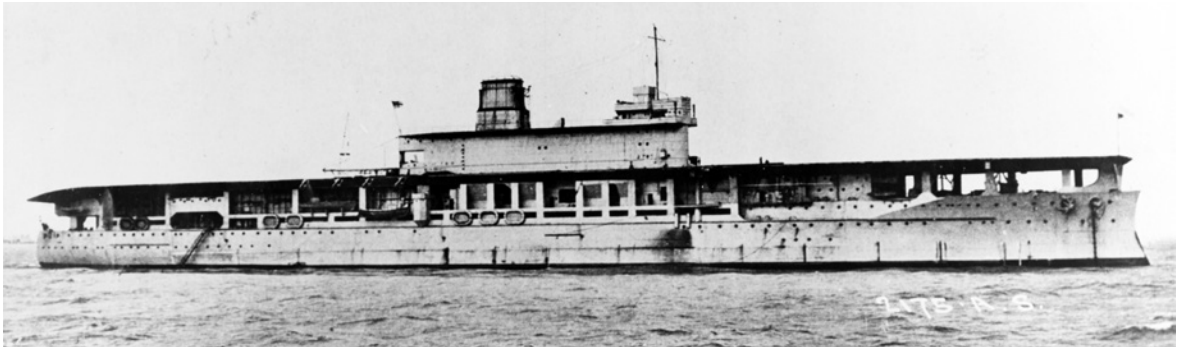
Jutland was an attempt by the German High Seas Fleet to trap part of the British Grand Fleet. The Germans intended to show themselves off Norway and catch the divided British fleet as it steamed to intercept the Germans. But the British had cracked German codes. Radio intelligence revealed the High Seas Fleet planned to sortie. When the Germans left port at 3.00am on May 31, the Grand Fleet had been at sea for nearly a day seeking the German fleet.

The Germans contacted the British battlecruiser force first, and followed the British battlecruisers into the British battle line – 24 dreadnought battleships deployed in a line, awaiting the Germans.

Canada was the 12th ship in line, part of the Third Division of the Fourth Battle Squadron. Three ships ahead of *Canada* was *Iron Duke*, the fleet flagship. *Revenge* and *Superb* came next, followed by *Canada*. Behind *Canada* was the First Battle Squadron, led by *Colossus*. The Grand Fleet's commander, Admiral John Jellicoe, placed his ships broadside to the oncoming German line.

Iron Duke opened fire shortly after 6.30pm. *Canada* joined in soon after, firing two broadsides at 6.40pm at a German cruiser. Forty minutes later, as shown in this plate, it fired another five salvoes at the German battle line.

Canada was not known to have made any hits with the 42 14in shells it fired, but suffered no hits itself.



HMS *Eagle* started out as the dreadnought *Almirante Cochrane*. While under construction it was renamed *Eagle* and converted to an aircraft carrier. Chile refused to take it unless it was reconverted to a battleship. Britain kept it. This shows its appearance when first commissioned in 1920. (USNHHC)

Riachuelo was canceled on May 13, 1915. Construction had been on hold since January. Even before then, progress had been glacial. Its material was used in other construction required by the Royal Navy.

Although *Almirante Cochrane* was well advanced, it required more work before it could be launched. Other projects had higher priority. Many of its uninstalled parts, including guns, armor plate, and gun mountings, were diverted to other projects. It was too advanced to scrap easily; the building slip was not urgently needed, so it sat neglected through 1917.

Brazil and Argentina remained neutral from 1914 to 1916. Their four dreadnoughts stayed close to home. They conducted training cruises and exercised their crews in the routine activities of a peacetime navy. In 1917 *Rivadavia* went to Comodoro Rivadavia to suppress a strike by oil workers. It was the most exciting activity of any of these four battleships during this period.

Life should have been livelier for the two Royal Navy dreadnoughts. Yet wartime service frequently combines the tedium of peacetime with sudden, unexpected violence. Mines and U-boats were a constant danger. In October 1914 HMS *Audacious* struck a mine and sank off the north coast of Ireland. The previous month three armored cruisers – *Aboukir, Cressy*, and *Hogue* – were torpedoed in the North Sea by a German U-boat. The result was a navy extremely wary of underwater peril.

For *Agincourt* and *Canada*, service with the British Grand Fleet involved months swinging at anchor at Lough Swilly in Ireland or Scapa Flow in the Orkneys, interrupted by brief periods at sea for gunnery practice or squadron maneuvers. These were punctuated by "sweeps" of the North Sea, intended to dare the German High Seas Fleet to sortie. Sweeps saw the Grand Fleet putting to sea and steaming across the North Sea searching, generally futilely, for German warships.

As ships built for South American navies, *Agincourt* and *Canada* were viewed warily by the Royal Navy. With sparse 9in main belt of armor, they were considered to be protected only as well as a battlecruiser. *Agincourt* with its great length and high length-to-beam ratio was subject to rumors it would break up should it fire all 14 main guns simultaneously.

Both ships fought at Jutland in 1916. *Canada* was still in the 4th Battle Squadron, with fleet flagship *Iron Duke*, *Revenge*, and *Superb*. *Agincourt* had been transferred to the 1st Battle Squadron, with *Marlborough* (flagship), *Royal Oak*, and *Hercules*. Their divisions contained ships from four different classes of battleship. In *Canada*'s division no two ships had the same size main gun.

Both ships played an active role in the battle. *Canada* fired 42 rounds from its 14in guns and 106 from its secondary armament. *Agincourt* had a

livelier battle. The 1st Battle Squadron was the unit closest to the German battle line, and came under heavier fire. The position became known as "Windy Corner." *Agincourt* fired 144 12in main gun rounds and 111 secondary rounds. Neither ship was hit and neither ship was known to have scored hits.

The two ships spent the rest of the war on patrols and exercises, without further major battles. *Canada* went through a minor refit. Two aft superstructure 6in guns were removed after suffering blast damage from the midship turret main guns. Both ships were present when the High Seas Fleet surrendered in November 1918.

Argentina remained neutral throughout World War I. Brazil declared war on Germany in October 1917 following the torpedoing of three Brazilian freighters by German U-boats. It volunteered to send *Minas Geraes* and *São Paulo* to join the Grand Fleet at Scapa Flow.

The Royal Navy was then transferring its oldest dreadnoughts away from the North Sea. It had no desire to add Brazilian battleships contemporary to the ones leaving the Grand Fleet. Less than ten years old, the Brazilian dreadnoughts were viewed as functionally obsolete by the Royal Navy. Both needed a refit, they had inadequate fire control system, and their broadsides were viewed as inferior.

Instead the two dreadnoughts, along with two Brazilian cruisers and six destroyers, patrolled a section of the Atlantic Ocean between Brazil, Gibraltar, and Dakar. Their opponents were U-boats. The dreadnoughts were of limited use. British fears about the reliability of the battleships were confirmed when in October 1918, *São Paulo* went to New York for an overhaul. It broke down, requiring the assistance of two US battleships to make port.

Almirante Cochrane had the strangest fate of any South American dreadnought. By late 1917 it was apparent that completing the vessel as a battleship would be prohibitively expensive. Britain had a surplus of battleships. It needed aircraft carriers, however. *Almirante Cochrane*'s hull was complete, and it was large enough and fast enough for an aircraft carrier.

Chile repurchased *Almirante Latorre* in 1920. This picture shows *Almirante Latorre* on sea trials shortly after reverting to Chilean colors. (LOC)

Refueling a coal-fired ship was an all-hands effort, requiring the crew to transfer bags of coal from barges and empty them into the coal bunkers. It typically took all day and left the crew and ship covered with coal dust. This shows *Minas Geraes* coaling. (LOC)

(While 24kt is thought of as slow today, in 1918 aircraft were smaller and slower.)

Conversion to an aircraft carrier began in January 1918. Tennyson d'Eyncourt, then DNC, designed the conversion. Renamed *Eagle*, the aircraft carrier was launched on June 8, 1918. *Eagle* was incomplete when the war ended, and construction again halted.

Between the World Wars

When World War I ended Britain had more battleships than it could use. The ships most immediately affected were the dreadnoughts confiscated from foreign nations in 1914, especially the three built for South American countries.

When Britain seized *Almirante Latorre* and *Almirante Cochrane*, it promised to return them at war's end. Once it was apparent the war would be lengthy, Britain purchased both ships. Now Britain decided to offer Chile its choice of battleships that were surplus to the Royal Navy.

Most of the capital ships proposed were elderly battleships or battlecruisers armed with 12in main guns, matching those of other South American dreadnoughts. Amidst concerns by Chile's neighbors that this would upset the naval balance of power – or trigger another naval arms race – Britain restricted the offer to ships contracted by Chile prior to World War I: the two Almirante Latorre-class dreadnoughts and six destroyers.

Latorre was serving as HMS *Canada*, a battleship, but *Cochrane*, while incomplete, had been extensively modified as an aircraft carrier. Chile

C

SÃO PAULO SHELLS FORT COPACABANA

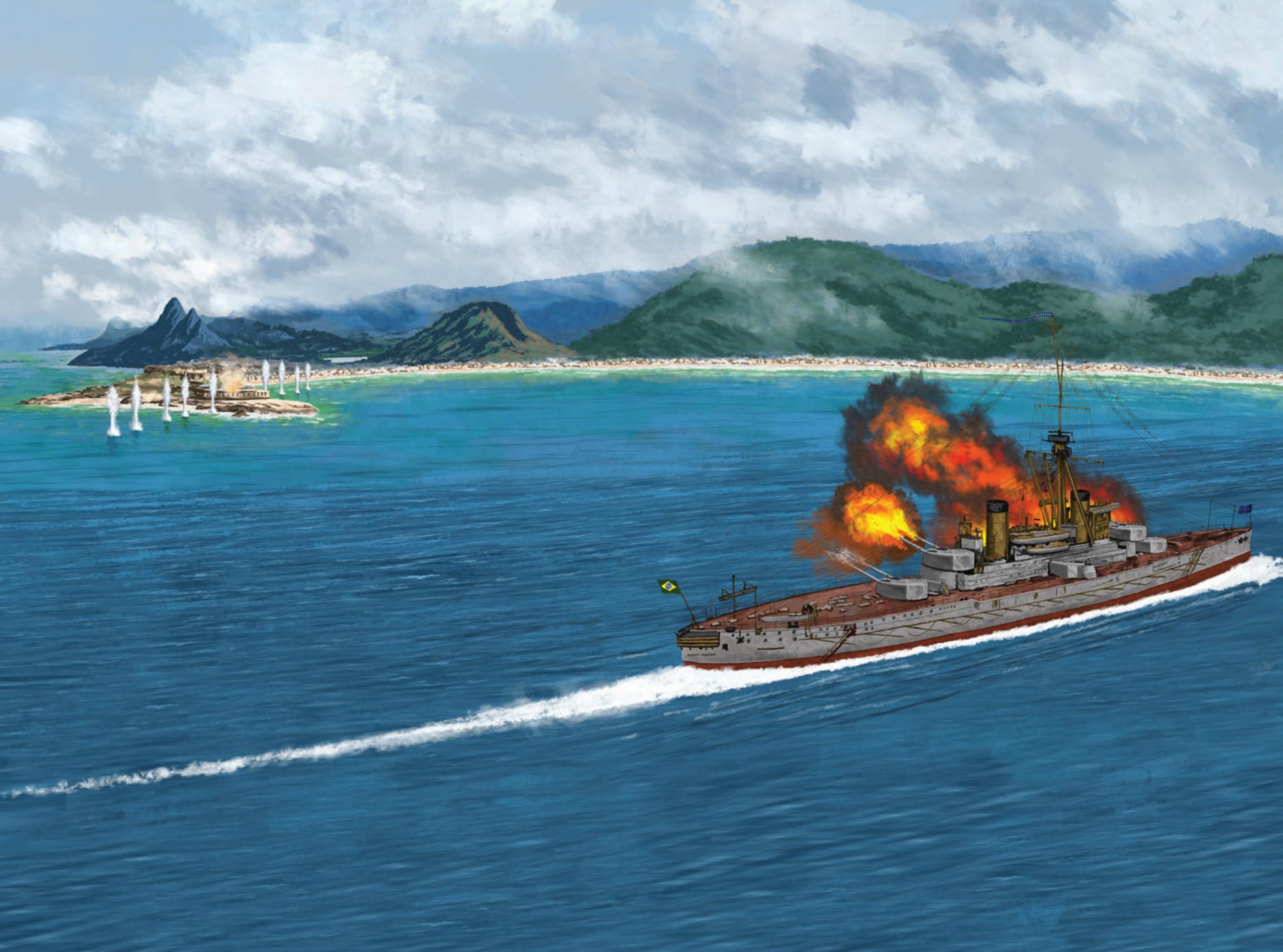
Five dreadnoughts flew South American flags. Despite the numerous mutinies, civil wars, and rebellions which swirled around these ships, only one fired its main guns in anger under South American colors, and then only once. (*Almirante Latorre* fought at Jutland, while named HMS *Canada*, under the White Ensign of the Royal Navy.)

The ship was *São Paulo*. The occasion was the second day of the Fort Copacabana Revolt on May 6, 1922. The previous day 301 officers and men had taken over Fort Copacabana demanding constitutional reforms. The revolutionaries backed their demands by shelling government buildings in the then-capital of Brazil, Rio de Janeiro.

Fort Copacabana was part of Rio de Janeiro's harbor defenses, a modern fort completed in 1914. It had two hemispherical turrets, one armed with a pair of 7.5in guns and the other with two 12in guns, as well as casemate-mounted 3in guns. The walls on the seaward side were 12m thick and the fort was topped with reinforced concrete.

To suppress the revolt, Brazil's congress ordered the navy to shell the fort. The next morning *Minas Gereas*, *São Paulo*, and a destroyer steamed out to the waters in front of the fort. The fort's guns were the equal of those carried on the Brazilian dreadnoughts, although Fort Copacabana had only two guns to each one of the dreadnoughts' broadside of ten guns.

Neither *Minas Gereas* nor the destroyer took any action. Only *São Paulo* opened fire, but its guns were felt. *São Paulo* fired five salvoes at the fort, scoring two hits. While the shells failed to penetrate the fort's defenses, they had the desired effect. Thirty minutes after *São Paulo* ceased firing, the rebels abandoned Fort Copacabana. It was the first – and last – time its 12in guns would speak in anger.



repurchased *Canada* for £1 million (half its construction cost), along with four destroyers. Taking possession of *Canada* in 1920, Chile restored the ship's original name when it was commissioned in August 1920. Newer, faster, and better armed than its Brazilian and Argentine counterparts, it was superior to any of the older battleships.

Almirante Latorre spent much of the rest of the 1920s conducting the routine activities of a peacetime battleship. It served as the flagship of Chile's navy, showing the flag at events and ceremonies, and serving as transport for Chile's president. After the 1922 Vallenar earthquake *Almirante Latorre* carried relief supplies.

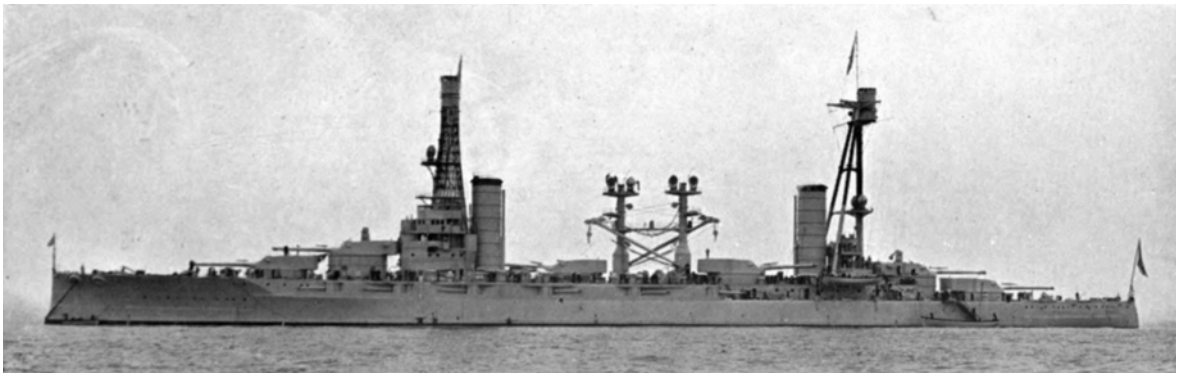
However, Chile would not repurchase *Almirante Cochrane* unless Britain converted it back to a battleship. Since Chile offered far less than the cost of restoring the ship to a battleship, Britain declined. Had Chile accepted the ship as an aircraft carrier, it would have possessed a vessel as cutting edge as *Minas Geraes* in 1910, and been the second nation to own an aircraft carrier. Instead, by 1922 Chile's fleet consisted of one dreadnought, a pair of ancient cruisers, and five destroyers.

Britain commissioned the partially finished *Eagle* in 1920, using it for six months of flight trials. These tests led to further modifications – a change in the shape of the island, conversion to exclusively oil fuel, and changes in the shape of the flight deck and the positions of the elevators. It was recommissioned in 1923 and served extensively in the Mediterranean and Far East throughout the 1920s and 1930s.

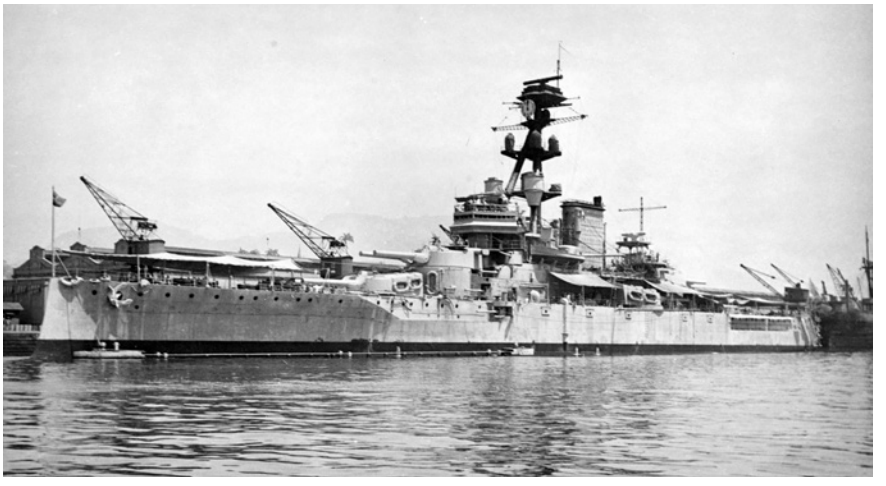
Agincourt, née *Rio de Janeiro*, remained a problem. It was too powerful to sell, but its 12in main battery was too light for the Royal Navy's battle line. In 1921 it was converted to oil fuel and transformed into a mobile naval base. The conversion was partially complete when *Agincourt* fell foul of the Washington Naval Limitations Treaty. It was scrapped in 1922.

São Paulo was dry-docked at Brooklyn Naval Yard when the war ended, having faulty boilers replaced. It went through a modernization improving gunnery control systems and internal protection. The secondary battery was reduced and 3in antiaircraft guns added. It completed the overhaul in January 1920. Once *São Paulo* returned to Brazil, *Minas Geraes* was sent to Brooklyn Naval Yard. Between August 1920 and October 1921 it went through a refit similar to *São Paulo*'s.

In July 1922 both dreadnoughts were at Rio de Janeiro when the garrison of Fort Copacabana rebelled against the government and began shelling the parliament building. Both battleships remained loyal and steamed against the



In 1937 ARA *Moreno* visited Spithead to attend the Coronation Naval Review. This photo was taken during that visit. Hanson Baldwin, the *New York Times* military correspondent, described it as "a strange vestigial sea monster." *Moreno* was younger than the United States Navy's representative at the Naval Review, USS *New York*. (AC)



The 1930s refit converting *Minas Geraes* from a coal-burning ship to an oil-fired ship dramatically changed its appearance. Gone were the graceful twin funnels, replaced by a stubby single smokestack. (USNHHC)

fort, although only *São Paulo* fired its guns. The bombardment convinced the rebels to surrender.

In November 1924 *São Paulo* mutinied in support of a rebellion against the national government. The crew attempted unsuccessfully to rally the navy to join it. It fled Rio de Janeiro (undergoing fire from Fort Copacabana and being pursued by *Minas Geraes*), steaming to join rebels in Rio Grande do Sul in southern Brazil. Failing to make contact with the rebels, *São Paulo* went to Montevideo in Uruguay. The mutineers gained political asylum, and *São Paulo* returned to Brazil escorted by *Minas Geraes*.

Rivadavia and *Moreno* spent the immediate post-war years less flamboyantly than their Brazilian counterparts. Both Argentinian ships comprised the First Division of the ARA, operating out of *Base Naval Puerto Belgrano* (BNPB). The ships conducted routine training cruises and readiness exercises between 1919 and 1923.

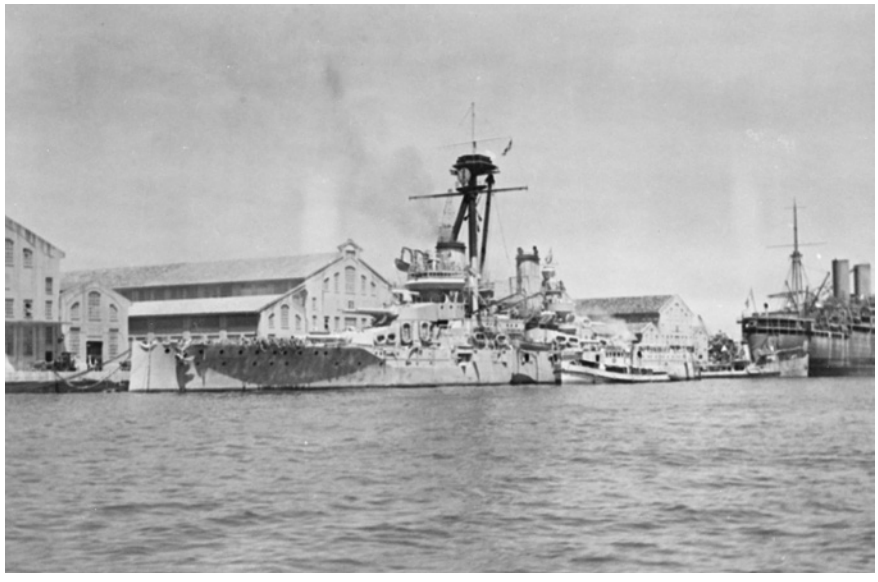
In 1923 Argentina's congress voted to modernize the ships. Both ships were sent to the United States in 1924 for rebuilds. The stump aft mast was replaced with a tripod mast. The 4in guns were removed; replaced with four 3in and four 3-pdr antiaircraft guns. Fire control systems were improved and rangefinders added to the superfiring turrets.

More significantly, the boilers were replaced and the ships converted from coal to oil fuel. Oil produced significantly more energy per unit of fuel than coal. One oil-fired boiler generated as much steam as two or three coal-fired boilers. Oil eliminated the need for stokers (reducing the engine room crew) and left no ash to remove. Oil eliminated the need for coaling of ships, a messy and time-consuming all-hands exercise.

The return of *Rivadavia* and *Moreno* in 1926 following the end of their refits triggered a race to modernize South America's dreadnoughts, much as Brazil's purchase of dreadnoughts triggered a battleship race prior to World War I.

Chile was first to follow Argentina. In 1929 it sent *Almirante Latorre* to Devon in England for a rebuild, which took three years. The steam turbine engines were replaced and oil-fired boilers substituted for coal-fired ones. The antiaircraft armament was upgraded from two 3in guns to four 4in guns. Gunnery control was modernized and an aircraft catapult fitted.

Brazil followed in 1931, initially planning to rebuild both dreadnoughts. A survey of *São Paulo* revealed it was in such a poor condition that it could



São Paulo was virtually immobile by World War II. After Brazil's entry into the war it served as a floating battery at Recife. This picture of the *São Paulo* was taken some time during its stay at Recife in 1943 or 1944. (USNHHC)

not be upgraded except at prohibitive cost. It was only capable of steaming at 10kt. *São Paulo* was rerated as a coastal defense ship.

Minas Geraes went through a complete rebuild at the Rio de Janeiro Naval Yard. It was the first and only South American dreadnought to go through a major overhaul in South America. The 18 coal-fired Babcock and Wilcox boilers were replaced with six oil-fired Thornycroft boilers. One boiler room and the side coal bunkers were converted to oil storage. The rest of the bunkers were removed. The two tall funnels were trunked into one long stubby one. Gunnery control systems were upgraded and rangefinders added to the superfiring turrets. The refit was completed in 1938.

One reason the refit took so long was the Great Depression. All three nations depended on exports of raw goods. Tariff increases passed by the United States in 1930 triggered a worldwide trade war. Exports crashed, and with this so did the Argentine, Brazilian, and Chilean economies. Cost-cutting reigned supreme.

Chile reacted by slashing sailors' pay in 1931, shortly after *Almirante Latorre* returned from England. On September 1, 1931 the Chilean fleet mutinied, led by *Almirante Latorre*'s crew. The mutiny was put down in a week, but only after airstrikes on the rebel ships.

The Argentine battleships spent much of the early Depression years in reserve. *Minas Geraes*' rebuild was slowed. *Almirante Latorre* was placed in reserve in 1933 and stayed laid up until a refit in 1937. Through the late 1930s only the Argentine dreadnoughts saw much sea time. By 1934 both were in commission again, and remained so through the rest of the decade. With *Latorre* decommissioned or dry-docked, *São Paulo* reduced to a coastal defense ship and *Minas Geraes* in a rebuild, these were the only South American dreadnoughts spending time at sea. In 1937 the pair were seaworthy enough to make a summer cruise to Europe, where they visited France, Britain, and Germany.

In 1939 a war began in Europe, which grew into World War II. South America's battleships were again in a world at war.

World War II and afterward

When World War I began the dreadnought was the apex of naval power. Even the oldest South American dreadnoughts were potent warships. At the start of World War II, the dreadnought's preeminence was being challenged by aircraft and submarines. The South American dreadnoughts were among the oldest still in commission. No Royal Navy or German dreadnought had been commissioned before World War I. The United States had only three and Japan two dreadnoughts launched prior to the newest South American dreadnought.

They were not only elderly, they were also in rough shape. Only Argentina had kept its battleships well maintained. *São Paulo* could barely move. *Minas Geraes* was seaworthy, but had inadequate underwater protection and an insufficient antiaircraft battery (a failing of all South American battleships). *Almirante Latorre* could not elevate its guns as much as its contemporaries in belligerent navies. If it had a combat encounter with a northern-hemisphere dreadnought, even one its own age, it would be badly outranged.

None of the dreadnoughts serving South American nations saw combat during World War II. All three nations began the war as neutrals, although all three eventually declared war on the Axis.

As they had been through much of the late 1930s, Argentina's battleships were in foreign ports when the war began. Both were taking part in midshipman cruises, visiting Brazil when Germany invaded Poland. They returned to BNPB on September 14 and stuck close to Argentina through the rest of the war.

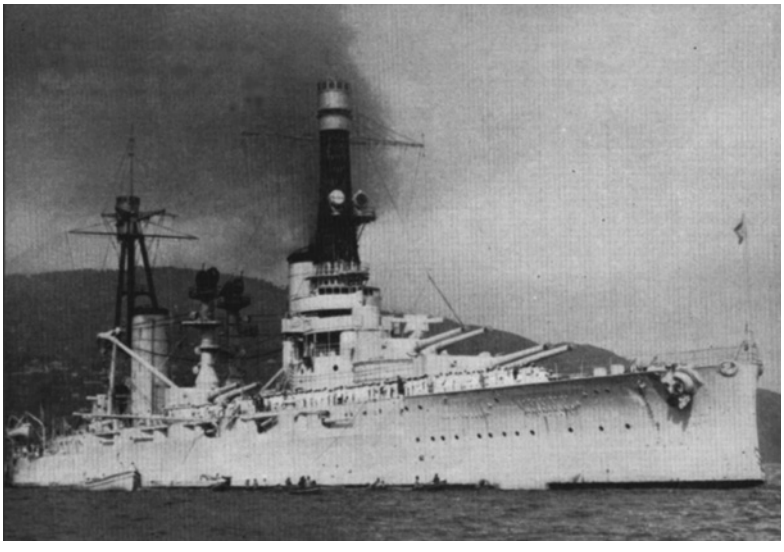
Brazil was the first of the three nations to go to war, joining the Allies in August 1942. As with World War I, the declaration of war was motivated by the German sinking of Brazilian merchant ships. Brazil's army sent a division to fight in Europe, but its battleships stayed close to home. Shortly after war was declared, *São Paulo* steamed to the Brazilian port of Recife, where it served as a floating battery until 1945. *Minas Geraes* served a similar function at Salvador.

Almirante Latorre was modern enough to generate interest in sending it to war. With ten 14in guns, it was nominally equivalent to the USS *Texas*. According to some sources, *Latorre* was offered first to Britain and then to the United States. Other sources claim the US tried to buy the ship after Pearl Harbor. Raising it to a condition equivalent to *Texas* or one of the British R-class dreadnoughts would have required a long dockyard stay, when dockyard resources would be better spent on new construction. *Latorre* remained with Chile, conducting neutrality patrols in the South Pacific between 1941 and 1945.

Argentina finally entered the war against the Axis in February 1945, and Chile declared war on Japan in April 1945. Neither nation had time to send its battleships to war before it ended, even had they been inclined to do so.

The only ship built for South America that did see action was HMS *Eagle*,

HMS *Eagle*, once *Almirante Cochrane*, was torpedoed and sunk during Operation *Pedestal* in 1942. As the aircraft carrier lists to port before capsizing, a Dido-class cruiser, either *Phoebe* or *Charybdis*, steams to pick up survivors. (© Imperial War Museum A 11360)



converted to an aircraft carrier. One of five fleet carriers in the Royal Navy when World War II began, it had an eventful career during the first three years of the war. It hunted German surface raiders and supply ships in the Indian and South Atlantic Oceans, and saw considerable combat in the Mediterranean. This included 11 missions in which it sailed from Gibraltar as part of task forces carrying aircraft to Malta. It was sunk on the 11th effort, Operation *Pedestal*, torpedoed by U-73 on August 11, 1942.

ARA *Rivadavia* after World War II. The Argentine battleships were active sea vessels until 1948. This photograph was probably taken during *Rivadavia*'s 1946 Caribbean cruise, the last major voyage made by the dreadnought. (AC)

World War II demonstrated the obsolescence of the dreadnought battleship, yet the remaining South American dreadnoughts soldiered on for over a decade. *São Paulo* steamed back to Rio de Janeiro after the war ended. It was reduced to a training ship in 1947. *Minas Geraes* remained in commission until 1952, but spent most of its time inactive. Argentina's battleships remained first-line units until 1950, even more of an anachronism in the atomic age than when they had visited Europe in 1937. *Almirante Latorre* remained a fleet unit even longer, remaining a seagoing part of the *Armada de Chile* until 1951. An engine room accident ended its active career.

By then newer, deadlier, and cheaper warships were available to the South American navies. The Cold War had begun, and the US and Britain were making war-surplus aircraft carriers and cruisers available to nations willing to ally with them. Aircraft carriers replaced battleships as the prestige warships of the ARA and *Marinha do Brasil*.

A British steel mill between 1910 and 1914 used to produce armor plate for dreadnoughts. Six of the eight dreadnoughts laid down for South American nations came from Great Britain, using the resources of its shipbuilding industries. (AC)

The battleships became harbor queens. *Rivadavia* and *Moreno* served as floating barracks or depot ships at BNPB from 1951 to 1956. *Almirante Latorre* served as a fuel oil storage vessel at Talcahuano until 1958. Finally they all went to the scrappers.

São Paulo went first, sold to an English shipyard in 1951. True to its contrary nature, the ship broke its towline in a storm north of the Azores. The ship was never found, sinking in an unknown location, taking the watch aboard with it.

Minas Geraes was next, sold for scrap in 1954 and broken up in a Genoese shipyard the following year. *Rivadavia* and *Moreno* went to the breakers in 1957. *Rivadavia* was broken up in Genoa and *Moreno* at the Yawata Steel Works in Japan. *Almirante Latorre*, the last to enter service, was last to be scrapped. It was sold in 1959 and broken up at Yokohama. With the exception of USS *Texas* and *Yavuz Sultan Selim*, it was the last surviving dreadnought from World War I.

THE SHIPS

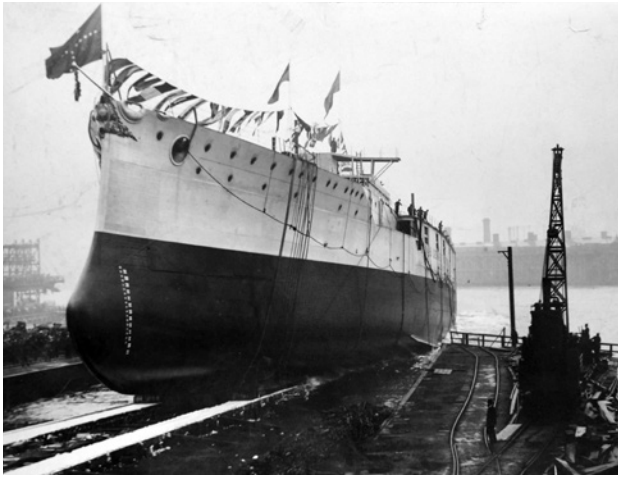
All measurements are imperial: feet, tons, knots, and horsepower. Length is length overall, unless noted otherwise. Draft is average draft. Displacement is long tons (2,240lb). The entry is marked "?" when values are unknown. Armament and other data are given as completed unless otherwise noted. All of these vessels were built to be coal-fired, or burned coal with oil sprayed on burning coal to provide extra energy. All were later converted to burn oil, changing the number and power of the boilers.

Ships listed in this section are those for which contracts were signed and work actually undertaken. This includes ships completed and commissioned, even those ships (such as *Rio de Janeiro* and *Almirante Cochrane*) which were commissioned in navies other than South American navies. It also includes the never-finished *Riachuelo*, using design information as contracted by Brazil and Armstrongs.

Service history is specific to each ship, providing detail absent in the Operational History section.

Minas Geraes class

Minas Geraes class	
Displacement	19,280 tons normal, 20,785 tons full load
Dimensions	543ft x 83ft x 25ft
Machinery	two vertical triple expansion engines (two shafts), 18 Babcock & Wilcox boilers, 24,000shp (27,212shp at speed trials)
Fuel	Coal: 800 tons normal, 2,305 tons maximum
Max Speed	21kt (21.43kt on trials)
Armament	12 12in/45cal (6×2), 22 4.7in/50cal guns (22x1), eight 3-pdr (47 mm) guns (8x1), four MG (4x1)
Armor	Belt: 4–9in (9in main belt); Deck: 1–2.5in; Barbettes: 12in; Turrets: 8–12in (2–3in roofs); Conning tower: 12in forward, 9in aft
Crew	1,200
Shipyard	*Minas Geraes* – Elswick, Newcastle, Great Britain; *São Paulo* – Vickers, Barrow-in-Furness, Great Britain
Laid down	*Minas Geraes* – April 17, 1907; *São Paulo* – April 30, 1907
Launched	*Minas Geraes* – September 10, 1908; *São Paulo* – April 19, 1909
Completed	*Minas Geraes* – January 5, 1910; *São Paulo* – July 12, 1910



Minas Geraes is launched from its building slip at Elswick Shipyard, Newcastle, on September 10, 1908. Note the Brazilian flag on the jackstaff. (LOC)

History: *Minas Geraes*

(Named after the Brazilian state of Minas Geraes)

Minas Geraes became a commissioned warship of *Marinha do Brasil* on January 5, 1910, at the British port of Newcastle. On its voyage to Brazil, it stopped at Norfolk, Virginia, rendezvousing with the pre-dreadnought battleship USS *North Carolina*, which was taking the body of Joaquim Nábuco, the late Brazilian ambassador to the US, home to Brazil. *Minas Geraes* escorted *North Carolina* to Rio de Janeiro, arriving on April 17. It was joined by *São Paulo* in July, forming the first dreadnought squadron in South America.

On November 22, 1910, *Minas Geraes* initiated the *Revolta da Chibata* mutiny, killing the captain and one other officer. (Several loyal and rebel sailors were also killed in the struggle.) Joined by *São Paulo* and coastal defense ship *Deodoro*, the three ships steamed in formation in Guanabara Bay. The battleships shelled Rio de Janeiro with their secondary armament (but not their main guns). The mutiny was ended through negotiation four days later. *Minas Geraes* stayed loyal during a December mutiny, bombarding a marine barracks controlled by rebels.

In World War I it formed part of a squadron patrolling the Atlantic Ocean between Brazil and Africa, but saw little combat. It went through a modernization refit in Brooklyn Naval Yard between 1920 and 1921. It was in Rio de Janeiro when the *Revolução Tenentista* (Lieutenant's Revolt) began in July 1922. Although *Minas Geraes* remained loyal, it took no part in combat. It also stayed loyal when *São Paulo* mutinied in November 1924, but did not fire at the mutinying ship, even after *São Paulo* fired a 3-pdr at it. *Minas Geraes* pursued *São Paulo* to Montevideo, Uruguay, but did not engage it. After the mutineers were granted asylum in Uruguay,

D

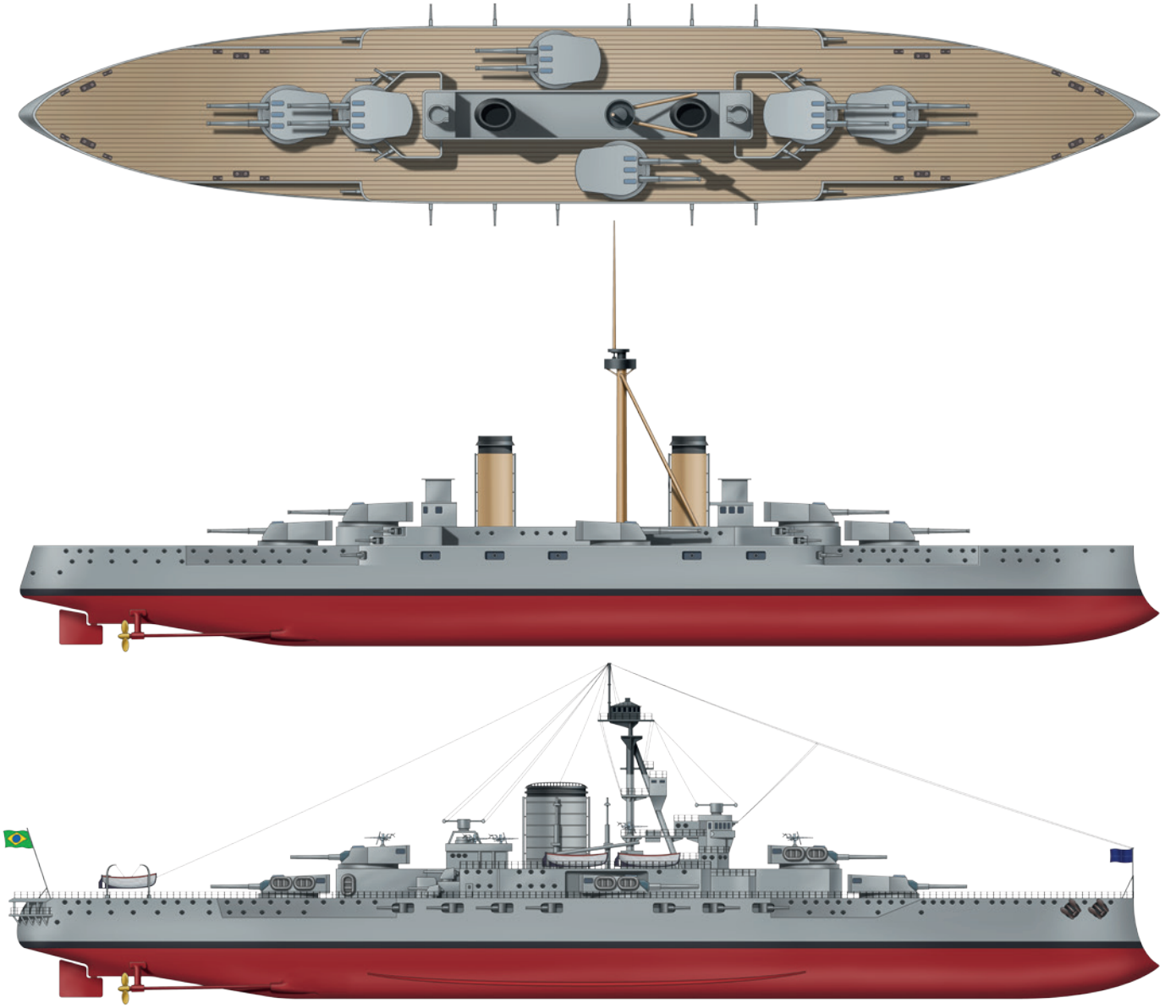
MINAS GERAES

When Brazil ordered *Minas Geraes*, it was a generation ahead of any other dreadnought being built. It had a heavier broadside than any battleship contemporary to it – ten 12in guns to the eight of the first-generation dreadnoughts of the Royal Navy, United States Navy, Kaiserliche Marine, or Imperial Japanese Navy. It also had superfiring turrets, a feature then incorporated only by the US Navy.

The Minas Geraes-class battleships were handsome ships when built. They were painted an overall light gray, with two tall buff-colored funnels and wood decks. They had only one mast, the characteristically British tripod mast with a pole topmast. Since the mast was aft of the forward funnel, these ships would have had problems with funnel smoke blowing over the range-finding team in the mast top. Their appearance was one reason Brazil ordered the ships: prestige. They exuded power, signaling that Brazil had arrived as a player on the world stage.

Minas Geraes went through a major rebuild in the 1930s, which changed the elegant appearance of the ship. Gone were the tall funnels, replaced by a short, wide single funnel. It was placed behind the fighting top, so the smoke went behind the range-finding team. In all, the new *Minas Gereas* looked less elegant but perhaps more menacing.

The upper side and top show *Minas Gereas* as it would have appeared on its maiden voyage to Rio de Janeiro. The lower side view reveals its appearance in 1927, after it completed its 1930s refit.



Minas Geraes conducting a firing exercise. The port turret is firing. Notice that the tampions covering the gun muzzles have been removed. (USNHHC)

Minas Geraes escorted *São Paulo* back to Rio de Janeiro from Montevideo.

Minas Geraes went through a major modification, starting in 1931 at Rio de Janeiro Naval Yard. The reconstruction was not complete until April 1938. In September 1938 it suffered a major fire, and returned to the shipyard for three weeks for repairs. While in commission when Brazil entered World War II, *Minas Geraes* was largely inactive. It went to the port of Salvador in the state of Bahia, and anchored there, serving as a floating battery to protect the port.

After World War II *Minas Geraes* was largely inactive, until it was decommissioned on May 6, 1952, and struck from the naval register on December 31. Purchased by SA Cantiere Navale de Santa Maria, it left Brazil under tow on March 1, 1954, arrived at Genoa, Italy, on April 22, and was broken up later that year.

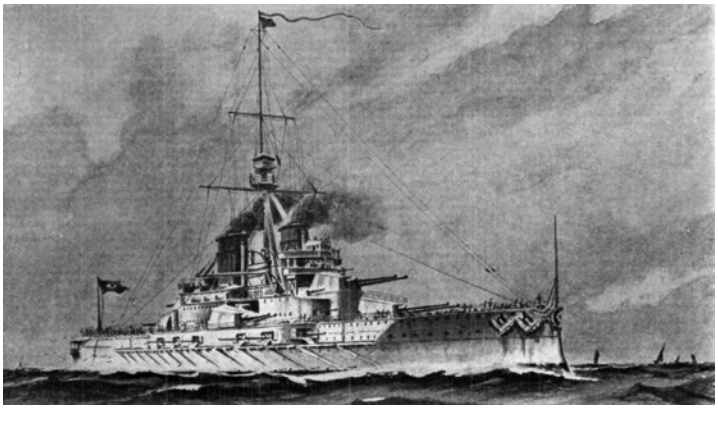
History: *São Paulo*

(Named after the Brazilian state of São Paulo)

The only South America dreadnought built at Vickers, it seemed to suffer quality problems throughout its life. As with *Minas Geraes*, *São Paulo* was built to an Armstrongs design.

During its shakedown cruise it stopped at the Tagus in Portugal. During the stay, a Republican uprising occurred and the Portuguese fleet mutinied in support. One Portuguese cruiser remained loyal to the monarchy, but it was captured. *São Paulo*'s crew, most raw conscripts, watched as the cruiser's officers were executed by their men. *São Paulo*'s guns deterred the revolutionaries from searching the battleship for Portugal's king. (He was not aboard, but was later offered asylum aboard the Brazilian warship. He refused the offer.)

Less than six months after it arrived in Brazil, *São Paulo* participated in its own mutiny, joining the *Revolta da Chibata* in November 1910. It steamed with *Minas Geraes* and *Deodoro*, bombarding Rio de Janeiro with its 4.7in guns. Its crew returned to loyalty after Brazil's congress voted an amnesty for the mutineers. *São Paulo* remained loyal when a second mutiny took place in December, but played no active role in putting down the rebellion.

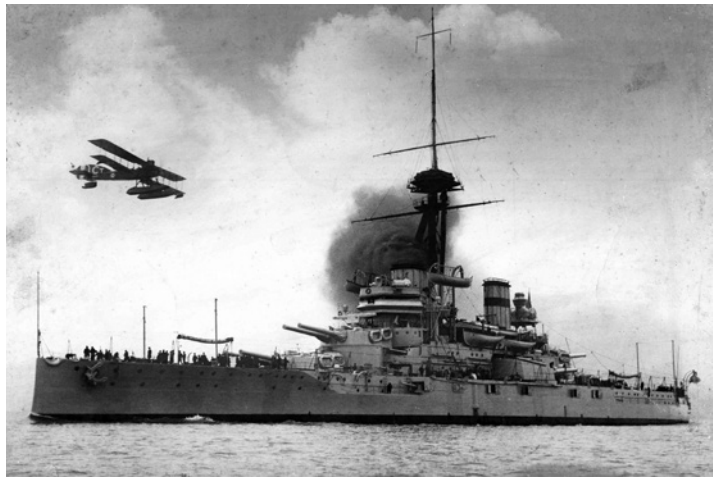


São Paulo in an artist's conception from an engineering magazine *circa* 1910. At the time, the Brazilian battleships were the world's most powerful warships, and drew significant attention in the trade press. (AC)

Along with *Minas Geraes* and other Brazilian warships, it patrolled the Atlantic Ocean between South America and Africa when Brazil entered World War I. Plagued with mechanical problems it was pulled off patrol and sent to Brooklyn Naval Yard for repairs in August 1918. It suffered major engine

breakdowns en route, arriving with only eight of 18 boilers working. The boilers were replaced during a lengthy refit, which ended in 1920.

On July 5, 1922, *São Paulo* was in Rio de Janeiro when junior officers in the Brazilian army mutinied in the *Revolução Tenentist* and took Fort Copacabana in that city's harbor. The fort began shelling government buildings in the city. The next day *São Paulo* bombarded Fort Copacabana, using its main guns, crushing the rebellion there.



The old and the new. A seaplane flies low over *São Paulo* in the 1920s. Aircraft had not yet supplanted dreadnoughts, but their day was coming. (MdB)

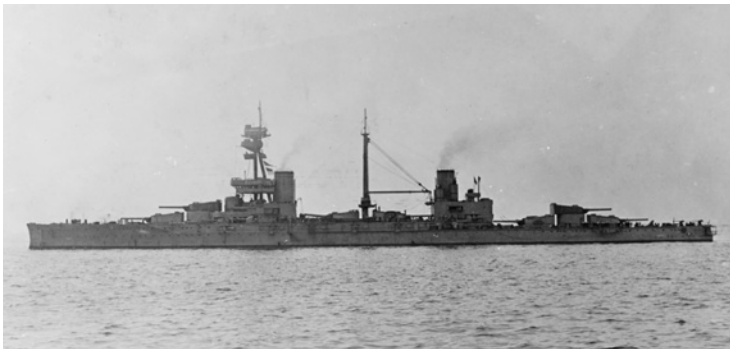
Two years later, on November 4, 1924, *São Paulo*'s first lieutenant, seven subordinate lieutenants, and several hundred sailors took over the battleship in support of the second *Revolução Tenentist*. They took the ship to join the rebels at Rio Grande do Sul, being bombarded by Rio's forts as they left harbor. Upon arrival they discovered the rebels had moved inland. The mutineers took the ship to Montevideo, where they received political asylum. Escorted by *Minas Geraes*, *São Paulo* returned to Rio de Janeiro. Its condensers failed on the trip, reducing it to half speed.

São Paulo was passed over for modernization in 1930 owing to its poor condition and rerated as a coastal defense ship. During the 1932 Paulista War, *São Paulo* served as flagship of a small naval squadron blockading the rebel port of Santos.

During World War II, the virtually immobile *São Paulo* served as a floating battery at Recife, guarding this important yet remote port. It returned to Rio de Janeiro in 1945. It was placed in reserve in January 1947, serving as an immobile training ship until 1951. It was decommissioned in September 1951 and sold for scrap. It broke tow and sank while being taken to Greenock, Scotland, to be broken up.

Rio de Janeiro

***Rio de Janeiro* specifications**	
Displacement	27,528 tons normal, 30,860 tons full load
Dimensions	688ft x 89ft x 29ft
Machinery	four Parsons direct steam turbines (four shafts), 22 Babcock & Wilcox boilers, 32,000shp (normal), 40,126shp (trials)
Fuel	Coal: 1,500 tons normal, 3,000 tons maximum; Oil: 800 tons
Max Speed	22kt (22.42kt trials)
Armament	14 12in/45cal (7×2), 20 6in/50cal guns (20x1), 10 3in/45cal guns (10x1), four 3-pdr (47mm) guns, three underwater 21in torpedo tubes (1x2 broadside , 1x1 stern, all fixed)
Armor	Belt: 4–9in (9in main belt); Deck: 1–2.5in; Barbettes: 2–9in; Turrets: 8–12in (2–3in roofs); Conning tower: 12in forward, 9in aft
Crew	1,267
Shipyard	Elswick, Newcastle, Great Britain
Laid down	September 14, 1911
Launched	January 22, 1913
Completed	(as HMS *Agincourt*) August 25, 1914



HMS *Agincourt* in 1918. The seven turrets of the ship originally built for Brazil as *Rio de Janeiro* can be clearly seen. (USNHHC)

History

(Named after the city of Rio de Janeiro, then capital of Brazil)

When Brazil decided to replace three pre-dreadnoughts with two dreadnoughts, it retained an option to order a third dreadnought built later. Shortly after delivery of *Minas Geraes*, Brazil exercised the option, but wanted a new design. Brazil's desire for the mightiest battleship in existence while retaining the same main battery as other Brazilian battleships led to the anachronistic main battery of 14 12in guns. (It was the last dreadnought designed with 12in guns in Britain or built by Britain, the United States, or Japan.)

Construction was well under way, with the ship launched and being outfitted, when in 1912 Brazil experienced a financial crisis. To economize Brazil ceased payment, and work ceased. In September 1913 Brazil sought a buyer for the ship. In December the Ottoman Empire bought the ship, renaming it *Sultan Osman-ı Evvel* (often translated as *Sultan Osman I*).

Work resumed in January 1914. The ship was about to be delivered to the Ottomans when World War I started. Britain seized it, commissioning it in the Royal Navy as HMS *Agincourt*. It joined the Grand Fleet in September 1914, serving in the Grand Fleet throughout the war. It was present at the battle of Jutland, at one point being engaged at the hottest part of the battle, but was undamaged.

After the war, *Agincourt* proved a puzzle. Although large and powerful, its anachronistic armament and poor internal subdivision and protection made it unsuitable for the Royal Navy. It could not be sold back to its owner – the Ottoman Empire was a defeated enemy. No other suitable

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RIO DE JANEIRO FIRES A BROADSIDE

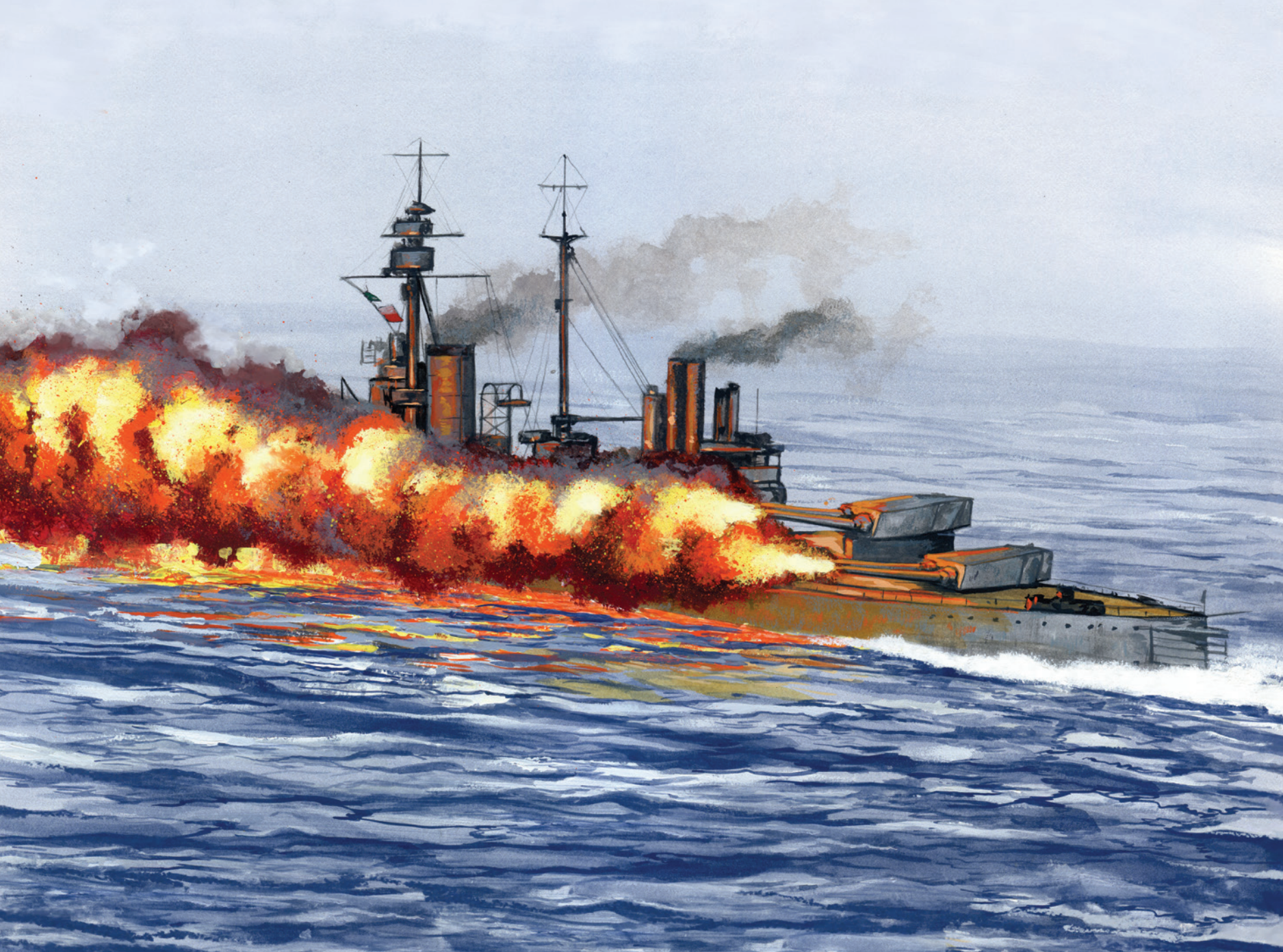
Because of its length and 14-gun main battery, many sailors in the Grand Fleet believed HMS *Agincourt* (née *Rio de Janeiro*) would break up, blow up, or roll over the first time it fired a broadside of its battery with a full charge. Sailors aboard other dreadnoughts mocked *Agincourt* as the ship the Germans could never sink: it would sink itself first.

As the ship worked up in the winter of 1914–15, *Agincourt*'s captain, Captain Douglas Nicholson, would take *Agincourt* out for gunnery practice in the Atlantic Ocean north of Lough Swilly on the northern coast of Ireland. Eventually the ship worked up to firing full broadsides, but with reduced charges, as was normal for gunnery practice. Full charge for a battleship was four bags of cordite, each bag for a 12in gun containing 65lb of cordite. Normally two or three bags were used during gunnery practice.

One bright winter day Captain Nicholson decided to silence the rumors. Instead of reduced charges he had each gun loaded with full charges: four bags with 260lb of cordite in the barrel of each 12in gun. Then he ordered a full broadside fired simultaneously.

The force of the blast was tremendous. Crockery and glass in the cupboards shattered. The concussion filled the crew quarters with coal dust shaken from the bunkers. But when the smoke cleared, *Agincourt* was still in one piece with no structural damage.

The rest of the Grand Fleet believed *Agincourt*'s crew was exaggerating when the ship returned to port. The broadside had been witnessed only by the escorting destroyers. Yet its crew knew their ship was sound, confidence that was valuable at the battle of Jutland 18 months later. Then *Agincourt* fired 144 12in shells over the course of the battle. The Germans may have tried to sink them, but *Agincourt* would not sink itself.



nation (including Greece, which had attempted to purchase *Rio de Janeiro* in 1913) was interested in purchasing it. The ship was placed on the disposal list in 1919.

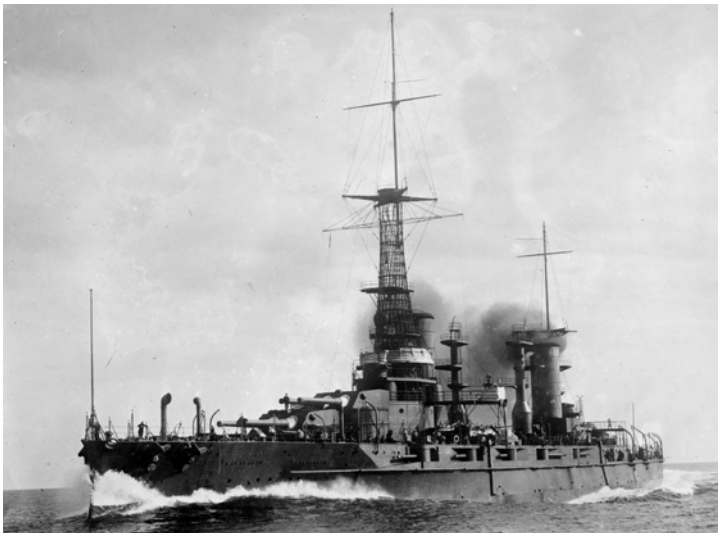
In 1921, attempting to get some use out of a solid hull, the Royal Navy began converting it into a mobile base. The after five turrets were removed. Extra ammunition and fuel storage was added. It would have been a useful and imaginative repurposing, allowing Royal Navy warships resupply and repair facilities in remote areas. Unfortunately the ship still qualified as a battleship under the 1922 Washington Naval Limitations Treaty. The partly completed conversion was canceled and *Agincourt* was scrapped in 1922, broken up before the year ended.

Riachuelo

(Never completed)

***Riachuelo* specifications**	
Displacement	30,500 tons normal
Dimensions	620ft x 94ft x 28ft
Machinery	four steam turbines, manufacture not specified (four shafts), Babcock & Wilcox boilers, no shp specified at cancelation
Fuel	Coal: 3,500 tons maximum; Oil: 700 tons
Max Speed	22.5kt (22.42kt trials)
Armament	eight 15in, probably 45cal (4×2), 14 6in/50cal guns (14x1), three 3in/45cal guns (3x1), four 3-pdr (47mm) guns (4x1), two underwater 21in torpedo tubes (2x1 broadside, fixed)
Armor	Belt: 6–13.5in (9–13.5in main belt); Deck: 2–2.5in; Barbettes: 11–13in; Turrets: 11–13in; Conning tower: 13in
Shipyard	High Walker, Newcastle, Great Britain
Laid down	never completed – scheduled September 10, 1914
Canceled	May 13, 1915

Rivadavia conducting speed trials in 1914. It had an easier time of it than sister ship *Moreno*, which required several rebuilds of its engines. (LOC)



History

The ship was named after the 1865 naval battle of Riachuelo, the largest naval action fought between two South American nations, and was the last dreadnought ordered by a South American nation. *Riachuelo* was intended to replace *Rio de Janeiro*. It can be thought of as a variant of the Queen Elizabeth-class dreadnought, although the coal-fired *Riachuelo* was longer and slower than the oil-burning Queen Elizabeths. *Riachuelo* was 1.5kt faster than the coal-fired Revenge class. *Riachuelo*'s scheduled keel-laying was postponed owing to the outbreak of World War I, and construction ultimately canceled in 1915, with the materials already purchased for it allocated to Royal Navy projects.

Rivadavia class

Rivadavia class specification	
Displacement	27,940 tons normal, 30,600 tons full load
Dimensions	594ft x 98ft 4.5in x 27ft 9in
Machinery	three Curtis geared steam turbines (three shafts), 18 Babcock & Wilcox boilers, 40,000shp
Fuel	Coal: 1,600 tons normal, 4,000 tons maximum; Oil: 600 tons
Max Speed	22.5kt
Armament	12 12in/45cal (6×2), 12 6in/50cal guns (12x1), 16 4in/50cal guns (16x1), two underwater 21in torpedo tubes (2x1 broadside, fixed)
Armor	Belt: 8–12in; Deck: 3in; Barbettes: 12in; Turrets: 9–12in; Conning tower: 12in
Shipyard	*Rivadavia* – Fore River, Quincy, Massachusetts, USA; *Moreno* – New York Shipbuilding, Camden, New Jersey, USA
Crew	1,046
Laid down	*Rivadavia* – May 25, 1910; *Moreno* – July 9, 1910
Launched	*Rivadavia* – August 26, 1911; *Moreno* – September 23, 1911
Completed	*Rivadavia* – August 27, 1914; *Moreno* – February 26, 1915

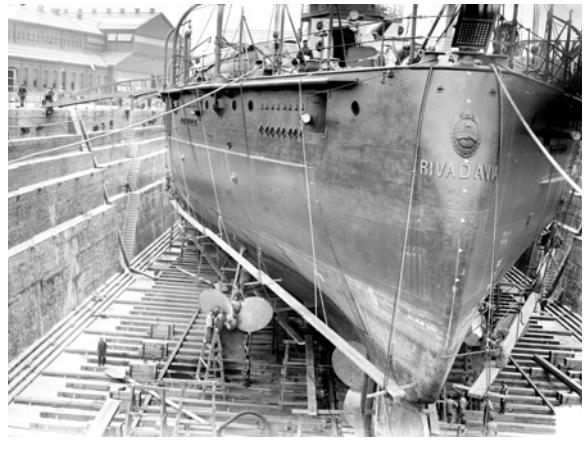
History: *Rivadavia*

(Named after the first Argentine president, Bernardino Rivadavia)
Built in response to the Brazilian dreadnoughts, *Rivadavia* was the only foreign dreadnought designed by a United States company, the only US-built dreadnought design built with wing turrets, and the only dreadnought built for a foreign company at the Fore River Shipyard. Construction was delayed by cash-flow problems at Fore River, preventing the purchase of armor in a timely manner. Purchase of Fore River by its chief creditor, Bethlehem Steel, in 1913 solved that problem, although delivery was further delayed owing to problems with its turbines. It was finally delivered in August 1914, and sailed to Argentina in December 1914.

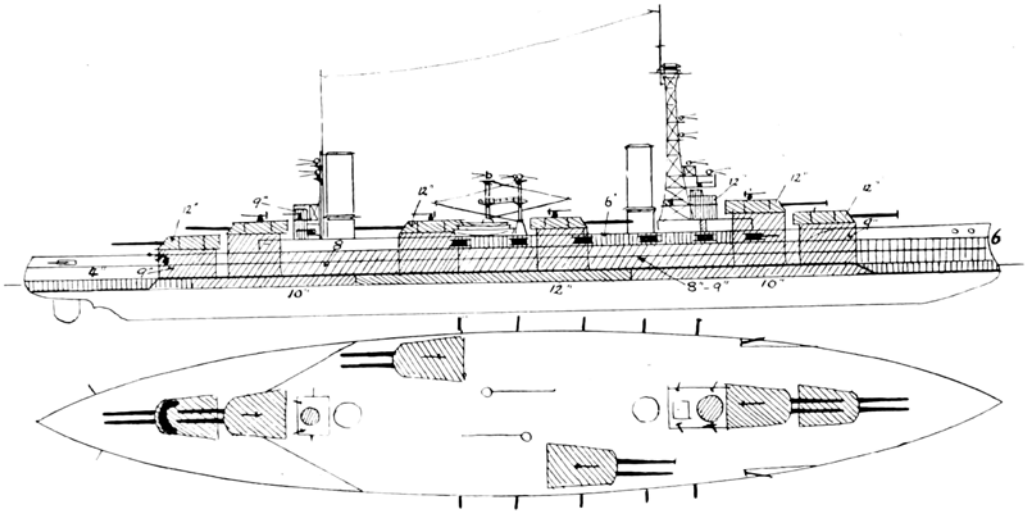
After its arrival in Argentina in February 1915 *Rivadavia* was assigned to the Training Division of *Armada de la República Argentina*. It remained there until 1917 when it was assigned to the First Division, remaining with it until 1922.

In 1922 *Rivadavia* was placed in reserve, with a reduced crew, and remained in reserve until 1923. Funds for modernization of *Rivadavia* were voted in 1923 and in August it was sent to Boston. There it received a rebuild, including conversion from coal to oil fuel. State-of-the-art range-finding and navigation equipment was installed. The rebuild added 1,000 tons to the ship's displacement.

Rivadavia returned to Argentina late in 1926. From 1927 to 1929 *Rivadavia* was assigned to the Training Squadron, during which period it made four training cruises. In 1929 it was reassigned to the Sea Squadron, along with *Moreno* and two cruisers. In December 1930 it went into reserve as a Depression-era economy move. In 1933 *Rivadavia* was recommissioned in the Battle Division of the Sea Squadron. During the next three years it alternated between readiness exercise and participation in naval reviews.



Rivadavia in dry dock getting its bottom cleaned and painted. The painting stages are set, and on the aft starboard side a dockyard worker is seated on a stage painting the hull. (LOC)



Plan of the *Moreno*.

The plan of *Moreno* showing the distribution of armor plating. The Argentine dreadnoughts had 12in main belts compared to the 9in belts typical of Brazilian and Chilean warships. The armor belt runs from bow to stern, although it is thinner at the ends. (AC)

In 1937 Argentina sent both battleships on extensive goodwill tours. *Rivadavia* visited ports in Chile, and then sailed to Europe. It visited Brest in France, where it was joined by *Moreno* after *Moreno*'s trip to England. Both battleships then steamed to Wilhelmshaven. The ships returned in 1938, when they rejoined the Battle Division. Argentina spent most of World War II as a neutral, and *Rivadavia* saw no action.

In 1946 *Rivadavia* made a diplomatic tour of the Caribbean. In 1947 it conducted a few sea exercises, but from 1948 until it was decommissioned in 1952 it remained docked at the BNPB. Between 1953 and 1957 *Rivadavia* was disarmed and stripped of useful equipment. *Rivadavia* was sold to an Italian shipbreaking firm on May 30, 1957. It was towed to Savona, Italy, in 1957, and broken up between 1958 and 1961.

F

RIVADAVIA AND *MORENO* IN EUROPE

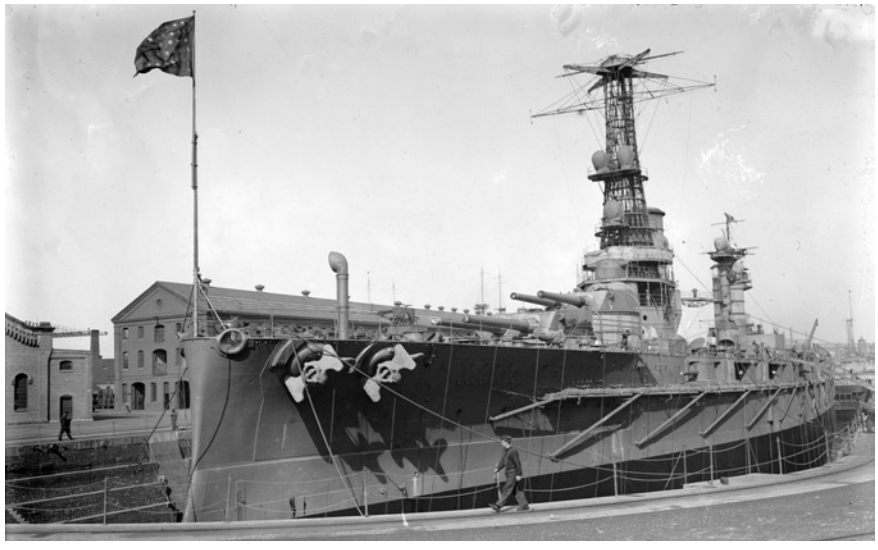
For whatever reason, Argentina did a better job of keeping its battleships at sea and cruising long distances than did Brazil or Chile. Brazil seemed to have maintenance issues with its ships, particularly *São Paulo*. With Chile the issue seemed economic; *Almirante Latorre* spent long periods laid up to save money.

Regardless, between 1933 and 1939 Argentina sent both battleships on a series of "show the flag" cruises, often together. The most ambitious of these was undertaken in 1937–38, when Argentina sent both ships on an extended cruise to Europe.

It was the most powerful display of South American seapower ever seen in Europe. The itinerary included port visits at Brest in France, Portsmouth in England, and Wilhelmshaven, Bremen, and Hamburg in Germany. The two ships split up at the entrance to the English Channel, with *Rivadavia* visiting Brest, the French naval base in Brittany. Meanwhile *Moreno* went to Portsmouth, where it attended the Spithead Naval Review on May 20, 1937, as Argentina's representative for the Coronation of King George VI. (While old, *Moreno* was still newer than the US Navy's representative, USS *New York*.)

Following the review *Moreno* steamed to Brest, where it rejoined *Rivadavia*. There the two ships departed together headed for Wilhelmshaven. This plate shows the departure; one of the few times a European audience would have an opportunity to see two South American dreadnoughts steam from a European port in company. It shows the two ships steaming past Pointe du Petit Minou, with its distinctive lighthouse, while departing Brest Harbor. The ships are dressed with flags with the crew lining the rails to make a good display as they left.

After stopping at Wilhelmshaven the battleships split up again, with *Rivadavia* going to Hamburg while *Moreno* visited Bremen. They returned to Argentina in late June.



Moreno in dry dock in the Brooklyn Naval Yard just before being delivered to Argentina. The jack flown at the bow is that of the US Navy, not a South American navy. (LOC)

History: *Moreno*

(Named after Mariano Moreno, one of the early political leaders in revolutionary Argentina)

While *Moreno* used the same Fore River design as *Rivadavia*, it was built at a different shipyard. The Argentine government wanted the second battleship to be subcontracted to a different yard to protect against non-delivery if Fore River went bankrupt. *Moreno* was delivered in early 1915.

After arrival in Argentina, in April 1915 it was assigned as flagship of the First Division of the Sea Squadron, operating out of BNPB and leading two armored cruisers and two destroyers. In 1916 it was assigned to the Training Squadron. It was reassigned to the First Division of the Sea Squadron in 1917, and remained there until 1922.

In 1923 it was placed in reserve, remaining decommissioned until its modernization rebuild. In 1924 it was placed back in commission to steam to a refit in the United States. It sailed from Argentina in December, travelling around South America to make diplomatic stops in Chile and Peru. It then transited the Panama Canal before steaming to Philadelphia, Pennsylvania. There it received a modernization rebuild similar to that of *Rivadavia*. In 1926 it went to Boston, where its guns were calibrated and trials were conducted. It was back at BNPB by August.

It served as part of the Training Division in 1927 and part of 1928, and was then decommissioned for the rest of the year. In 1929 it conducted a midshipman cruise to the southern tip of Argentina, reaching 55.5 degrees south. Between 1929 and 1931 it was part of the First Division.

In 1932 it was transferred to the Battle Division, joined by *Rivadavia* in 1933. *Moreno* participated in a goodwill tour to Uruguay and Brazil in 1933 and in 1934 supported national celebrations in Puerto Maydryn and Buenos Aires.

In 1937 Argentina sent both battleships on extended goodwill tours. In January 1937 *Moreno* went to Valparaiso, Chile, and Callao, Peru, on a summer cruise. In February, in company with *Rivadavia*, it steamed to Europe. *Moreno* detached from *Rivadavia* to attend the naval review at Spithead for the coronation of Britain's King George VI. It rejoined *Rivadavia* at Brest, sailing in company with *Rivadavia* to Wilhelmshaven.

Its World War II history parallels *Rivadavia*. After World War II it remained active as part of the Battle Squadron until 1949. From then until it was decommissioned in 1956 it remained docked at BNPB. It was sold for scrap in 1957 and towed to Yawata in Japan, where it was scrapped.

Almirante Latorre

***Almirante Latorre* specifications**	
Displacement	28,000 tons normal, 30,800 tons full load
Dimensions	661ft x 92ft x 28ft 6in
Machinery	two Brown-Curtis high-pressure steam turbines, two Parsons low-pressure steam turbines (four shafts), 21 Yarrow boilers, 37,000shp (normal)
Fuel	Coal: 1,200 tons normal, 4,000 tons maximum; Oil: 500 tons
Max Speed	22.75kt
Armament	ten 14in/45cal (5×2), 16 6in/50cal guns (16x1), four 3in/45cal guns (4x1), four MG (4x1), four underwater 21in torpedo tubes (2x2 broadside, fixed)
Armor	Belt: 4–9in (9in main belt); Deck: 1–2.5in; Barbettes: 4–10in; Turrets: 8–12in (2–3in roofs); Conning tower: 10in
Crew	884
Shipyard	Elswick, Newcastle, Great Britain
Laid down	May 1, 1912
Launched	November 27, 1913
Completed	(as HMS *Canada*) September 13, 1915

History

(Named after Admiral Juan José Latorre Benavente, Chile's greatest naval hero. Originally named *Valparaiso* after the Chilean port, then *Libertad* "Liberty," but renamed after Admiral Latorre after he died in July 1912.)

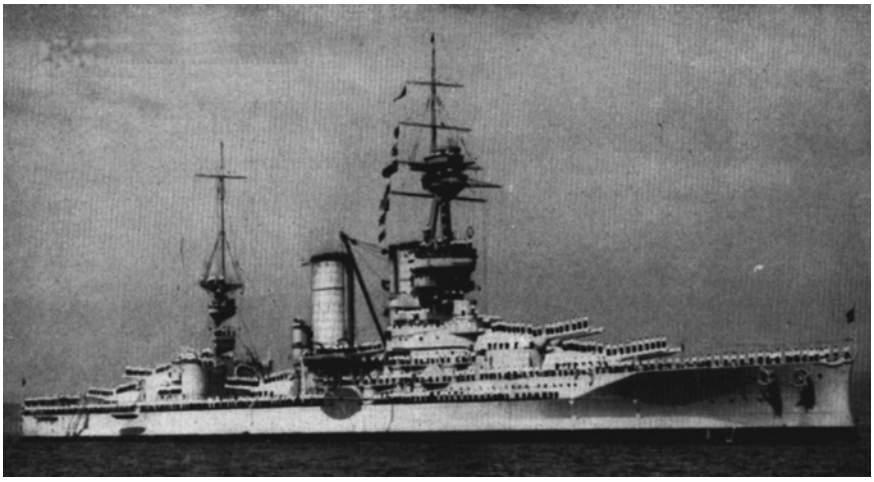
Almirante Latorre was the Chilean response to the Argentine battleships. It can be thought of as an Iron Duke-class dreadnought built to Chilean specifications, with heavier guns, but lighter armor. It was the only second-generation dreadnought built for a South American nation, making it the most powerful South American dreadnought.

Bow view of *Almirante Latorre* while anchored during the 1930s. (AC)

Almirante Latorre had been launched, but was nearly a year from completion, delayed by late delivery of armor, when World War I started. Work ceased, but resumed in September after the ship was taken over by the Royal Navy. Negotiations over the disposal of the ship continued while work carried on. While Britain originally planned to borrow the ship until the war's end, it finally purchased both Chilean dreadnoughts with an option for Chile to repurchase them after the war ended.

Completed in 1915, the ship was renamed HMS *Canada*. It joined the Grand Fleet as part of the 4th Battle Squadron. It spent most of the war without incident, but fought at the Battle of Jutland, the third ship behind Admiral Jellicoe's flagship, *Iron Duke*.

With the war's end, Britain no longer needed *Canada*. It was sold back to Chile for £1 million, less than half its construction cost. Included in the price was a refit, during which the fire control system and the armor protection were upgraded. The ship was turned over to Chile on August 1,



Almirante Latorre after World War II. This picture shows the ship between 1946 and 1948 on a formal occasion with the crew manning the rails. (NARA)

1920, and rechristened *Almirante Latorre*. On November 27 it sailed for Chile, arriving at Valparaiso on February 20, 1921, following its shakedown cruise. It served as the flagship of *Armada de Chile* for the next eight years.

By 1928 it needed a refit and modernization. It was sent to England on May 15, 1929, and spent two years being upgraded. It returned to Chile on April 12, 1931. Shortly after returning, the ship's crew participated in a general mutiny by the *Armada de Chile* over crew pay cuts. It returned to duty when the mutiny collapsed a week later. It remained in commission until 1933, when it was laid up as an economy measure. In 1937 it went through another refit, with eight 20mm antiaircraft guns added.

Chile remained neutral through most of World War II, and *Almirante Latorre* was used on South Pacific neutrality patrols. It was refitted at Talcahuano, Chile, in 1950, but experienced an engine room explosion in 1951. Repairs were never completed and *Almirante Latorre* remained inactive until struck in 1958. The following year it was sold to Mitsubishi for scrap, towed to Japan and broken up at Yokohama.

G

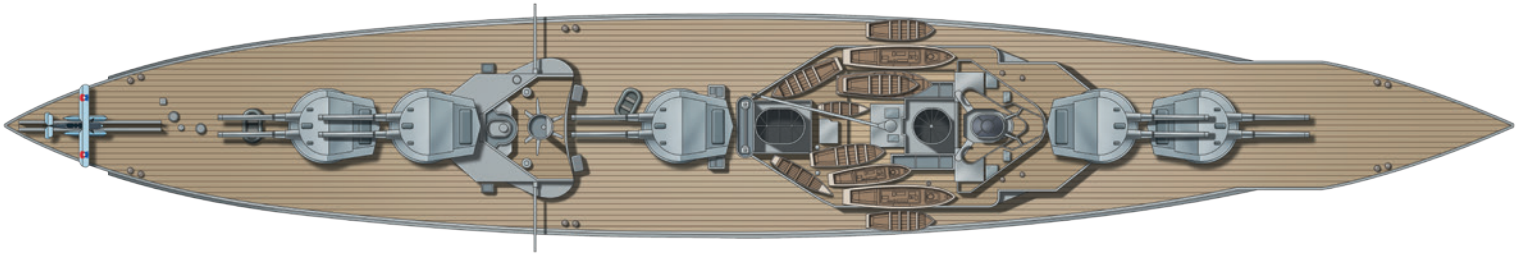
ALMIRANTE LATORRE IN 1922 AND 1933

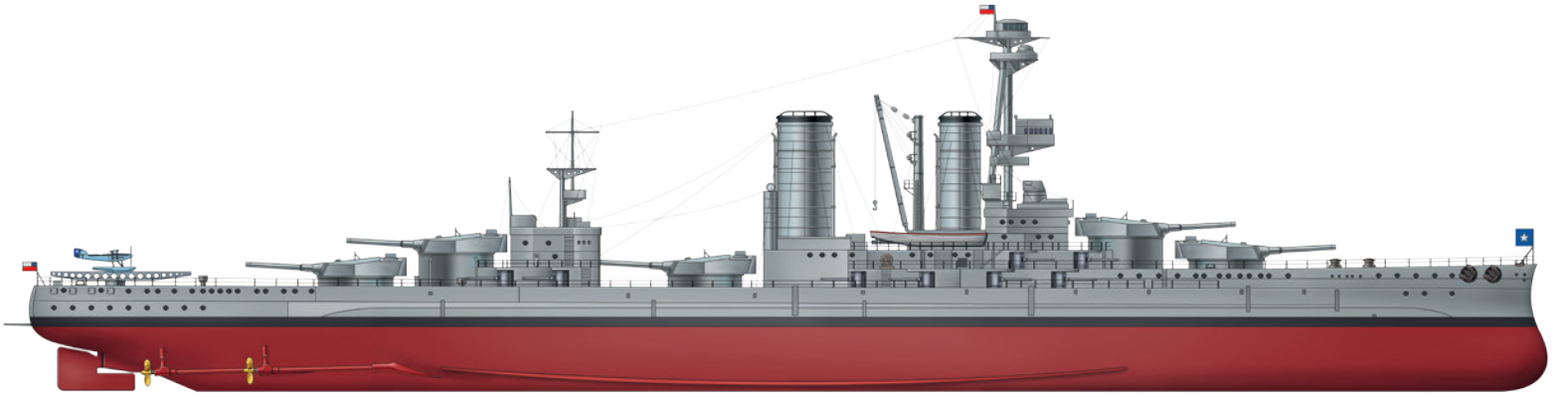
Almirante Latorre was the only second-generation dreadnought built for a South American power. These "super-dreadnoughts" were characterized by better protection, larger guns, and bigger engines with greater speed. They were also distinguished by "all or nothing" armor, with no armor at the bow and stern allowing thicker armor protecting the magazines and engines. *Latorre* carried a 14in main battery, and although it had only a 9in armor belt it followed the "all or nothing" principle, with an unarmored forecastle and stern.

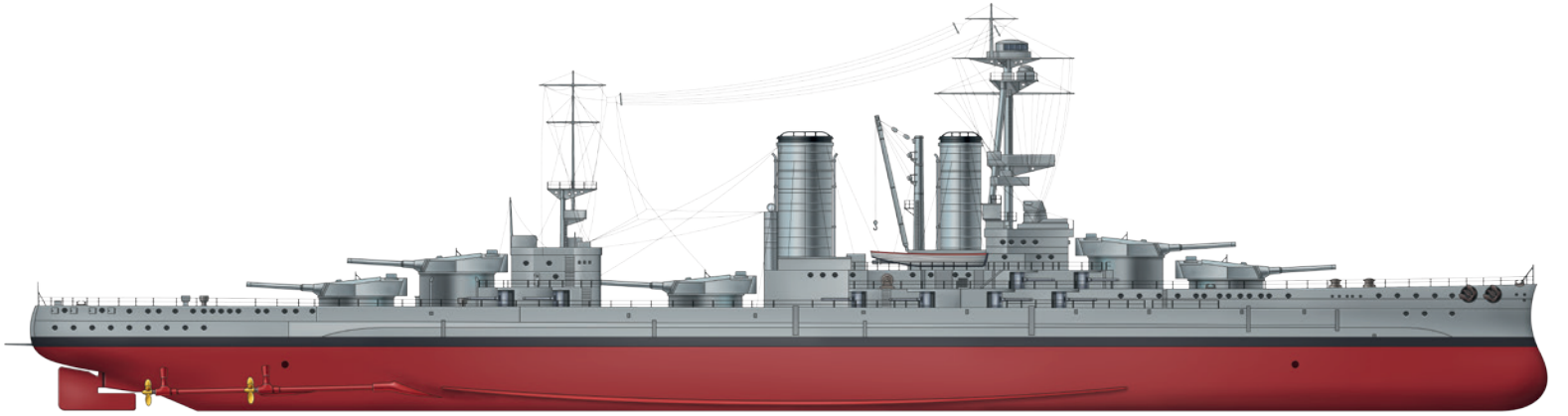
Latorre went through two major rebuilds in its lifetime: once in 1920 before being sold back to Chile and a second, more extensive, refit between 1929 and 1931. This plate shows the ship as it would have appeared immediately after both refits. The 1929–31 refit shortened both fore topmast and the mainmast, adding an enclosed bridge on the foremast and additional platforms at the top of the lower foremast. Rangefinders were added to the superfiring turrets and the center turrets, allowing local control.

The most obvious change was the addition of an aircraft catapult on the quarterdeck. The catapult was purchased in Italy and added immediately after the refit. *Latorre* became the only South American battleship capable of operating aircraft.

It carried one Fairey IIIF seaplane, shown in the plate with Chile's characteristic shield insignia. It was present only between 1931 and 1933. *Almirante Latorre* was laid up in 1933, remaining inactive until a new refit in 1937, when the catapult was removed.







Almirante Cochrane/Eagle

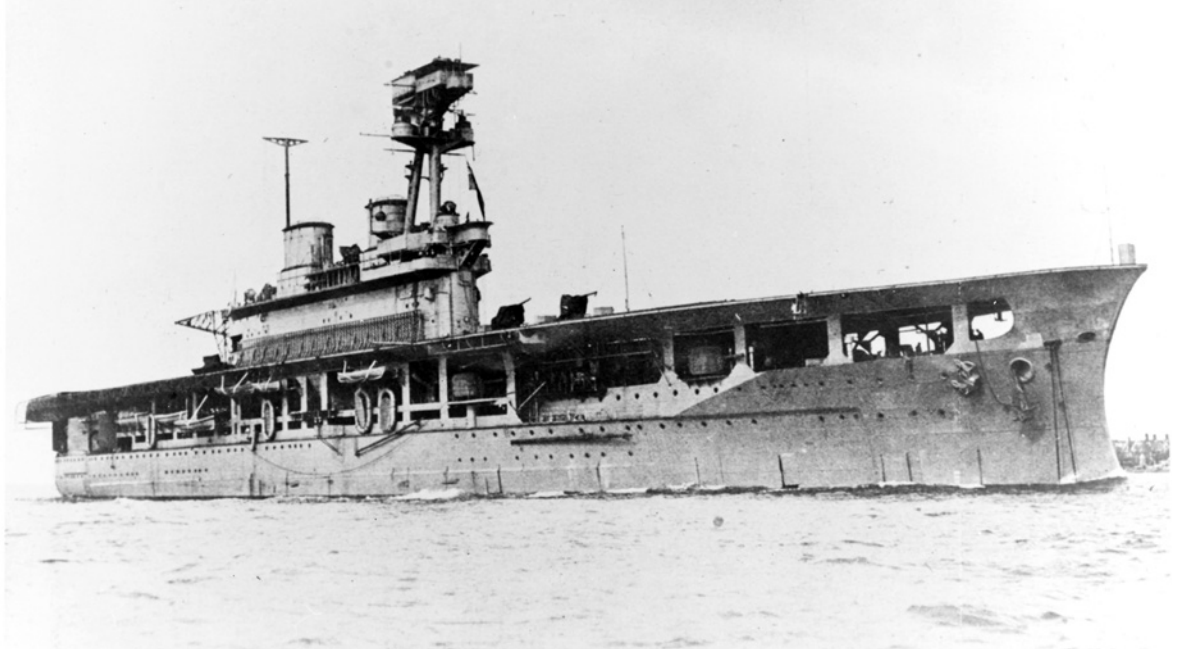
(As completed as an aircraft carrier)

***Almirante Cochrane/Eagle* specifications**	
Displacement	22,600 tons normal, 36,680 tons full load
Dimensions	667ft 6in x 105ft 2in x 21ft 6in (standard), 26ft 6in (deep)
Machinery	two Brown-Curtis high-pressure steam turbines, two Parsons low-pressure steam turbines (four shafts), 21 Yarrow boilers, 55,000shp (normal)
Fuel	Oil: 3,700 tons; Coal: 1,750 tons normal
Max Speed	24kt
Armament	six 6in/50cal (6x1), two 3in/45cal guns (2x1), four MG (4x1), 24 aircraft
Armor	Belt: 4.5in; Deck: 1.5in main deck and hangar deck; Bulges: 1.5in
Shipyard	Elswick, Newcastle, Great Britain
Crew	834
Laid down	February 24, 1913
Launched	June 8, 1918
Completed	(as HMS *Eagle*) April 13, 1920

History

(Originally to be named *Santiago*, but renamed *Constiución*, and then renamed *Almirante Cochrane* after the English and Chilean naval hero. Renamed *Eagle* – a traditional capital ship name – when impressed into the Royal Navy.)

Intended as Chile's second dreadnought, the hull was largely finished but incomplete when World War I started. Work was halted in August 1914 and not resumed until January 1918. Britain purchased the hull from Chile, converting it to an aircraft carrier. While launched in June 1918, it was not completed until 1920. Work slowed after Armistice Day, stopping in November 1919 as the Royal Navy absorbed the lessons provided by its first flight-deck carrier, HMS *Argus*.



HMS *Eagle* following its 1924 rebuild. A second smokestack was added following installation of more boilers, the bow is faired over, and a tripod mast – similar in appearance to that of once-sister *Almirante Latorre* – has replaced the pole mast of 1920. (USNHHC)

Britain offered to return it to Chile, which refused unless converted back to a battleship at Britain's expense. The ship was partially completed in April 1920 to allow it to be used for testing purposes. After several months of flight operations it was returned to the shipyard. The rest of its engines were installed, and modifications made to its flight deck and island. *Eagle* finally became a fully commissioned Royal Navy warship on February 26, 1924.

Over the next 14 years *Eagle* served in the Mediterranean and the Far East. In 1934, off China, its aircraft attacked pirates. In 1931 it was sent to Argentina to demonstrate naval air power. It went through refits in 1926, 1929, 1932, 1936, and 1939.

Eagle had completed its 1939 refit in Singapore when World War II began. From September 1939 to May 1940 *Eagle* patrolled the Indian Ocean searching for German surface raiders. From May 1940 until April 1941 it operated in the Eastern Mediterranean, supporting actions against Italy. It was then sent to the South Atlantic to hunt Axis surface raiders.

Eagle went through a refit in England in October 1941, and was then sent to Gibraltar. From February to August 1942 *Eagle* conducted trips to supply Malta, then under aerial siege from Axis fighters. During Operation *Pedestal*, in August 1942, *Eagle* was struck by four torpedoes and sank.

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AUTHOR'S DEDICATION

To Pilar, my new daughter-in-law. Welcome to the family.

AUTHOR'S NOTE

The following abbreviations indicate the sources of the illustrations used in this volume:

IWM – Imperial War Museum, UK

MdB – *Marinha do Brasil*

NARA – National Archives

LOC – Library of Congress, Washington, D.C.

USNHHC – United States Navy History and Heritage Command, Washington, D.C.

AC – Author's Collection

Other sources are listed in full.

A few notes on names. Some ships had names whose spelling varied depending on the alphabet used. A few others simply varied. *Minas Geraes* was later spelled *Minas Gerias*. *Geraes*, used first, is applied throughout for consistency.

GLOSSARY

All-or-Nothing Armor – A warship design philosophy where armor protected the vitals of a warship – the center of the ship where the magazines, engine rooms and boilers were located – but left the ends unarmored. The theory was that by leaving the ends unarmored, the weight saved could be used to thicken the belt armor in the protected portions of the ship.

Barbette – The protective cylinder of armor supporting a turret and shielding the turret's traverse mechanism and ammunition hoists.

Battleship – A large, heavily armored warship with a main battery of the largest-caliber guns available. Between 1880 and 1949 battleships were the most powerful warships.

Casemate – An armored gun mounting on the side of a warship, from which a secondary gun fired.

Centerline Turret – A turret mounted in the centerline of a warship.

Dreadnought – A battleship which mounted more than two main gun turrets, with light secondary guns intended only to engage small warships.

En Echelon – Turrets mounted at an oblique angle to each other.

Super-dreadnought – A second-generation dreadnought, typified by main guns larger than 12in, all-or-nothing armor, and better compartmentalization than first-generation dreadnoughts.

Superfiring Turret – A turret mounted above the turret next to it so that it can fire over that turret.

Triple Expansion Steam Engine – A reciprocating steam engine with a high-pressure cylinder, a medium-pressure cylinder, and a low-pressure cylinder. The exhaust from the higher-pressure cylinder is used in the next lower-pressure cylinder so that more of the steam's energy can be captured for propulsion.

Triple Turret – A gun turret mounting three guns in it.

Wing Turret – A turret mounted on the sides or wings of a ship as opposed to being mounted on the centerline.